FLORA OF ASSAM

BY

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VOL. IV.

NYCTAGINACEÆ TO CYCADACEÆ

_Published under the authority of the Government of Assam._
First correction slip to "Flora of Assam Vol. IV."

P. 158- Read - Reidia tetrandra (Roxb) M. V. Narayanswami, n. comb. Mss., in place of "Reidia tetrandra (Roxb) A. Das, n. comb."

P. 158- Read - Fluggeopsis glauca (Wall) M. V. Narayanswami, n. comb. Mss., in place of "Fluggeopsis glauca (Wall) A. Das, n. comb."

P. 318- Read - Pasania Milroyia (Purkayastha) A. Das, n. comb., in place of "Pasania Milroyia A. Das, comb."
FOREWORD.

The publication of Volume IV brings the Flora of Assam to the end of Dicotyledons. Again the late Rai Bahadur U. N. Kanjilal's collections and his excellent field-notes have been of every help in drawing up descriptions of species mentioned in this volume. Of the Monocotyledons, Gramineae have already been taken up by Dr. N. L. Bor, Forest Botanist, Forest Research Institute, DehraDun and will shortly be published as Volume V of the Flora of Assam.

In the task of publication of this volume, I had to do all the proof-reading and to make some additions and alterations here and there. Again I have to record my appreciation of the loyal assistance given by Babu Banka Bihari Syam, my Botanical Assistant. Every endeavour has been made to avoid mistakes.

Shillong, The 26th February, 1940.

R. N. De, I.F.S.,
Botanical Forest Officer.
PREFACE

It is with great pleasure that the fourth volume of the "Flora of Assam" (Apetalæ & Conifereæ) is presented to the public. The original manuscript of this volume was completed by me in December, 1934. Mr. P. C. Kanjilal, B.Sc., I.F.S. (now of U. P.) offered his ungrudging help and assistance in the preparation of this work, particularly in dealing with Lauraceæ a rather difficult family. Exhaustive, accurate and elaborate field-notes of the late Rai Bahadur U. N. Kanjilal have been freely utilised and reproduced in the descriptions, although in most cases they have been drawn up with reference to the living plants or to the herbarium specimens or to both. Addition of fresh materials and revision of my original manuscript continued over a period of about 18 months, and I am glad that I have been able to complete the manuscript in time for its publication within the current year. In course of this work, it was absolutely necessary to make many references to Kew, Sibpur, Edinburgh and DehraDun. I had to run down occasionally to Calcutta to work in the Herbarium of the Royal Botanic Garden, Calcutta, in order to be conversant with the changes in nomenclature and to draw up and check descriptions of new species and new records with reference to literature and by examining actual specimens preserved there. Such a step on my part has told upon my advanced age and my purse in my retired life.

Several species (not previously included) have also been added to this work in smaller types or without serial number. This procedure had to be adopted in order to avoid alterations in the generic and specific Keys. It is, however, not claimed that the compilation of the "Flora" is fully comprehensive. Omission in this volume of a number of species of herbs, shrubs and trees could not be avoided. Attempt has, however, been made to raise the standard of this volume. It is impossible to do justice to a work of this
nature without proper facilities for ready reference, which unfortunately have not been available for me.

I wish to record my sincere thanks and indebtedness to all the botanists, who have rendered assistance in various ways in the compilation of this Volume.

(1) Prof. Sir W. W. Smith, Regius Keeper, Royal Botanic Garden, Edinburgh.
(2) Mr. C. E. C. Fischer, Royal Botanic Garden, Kew.
(3) Director, Royal Botanic Garden, Kew.
(4) Superintendent, Royal Botanic Garden, Sibpur.
(5) Forest Botanist, Forest Research Institute, DehraDun.
(6) Prof. B. H. Danser, Groningen.
(7) Mr. M. V. Narayanswami, Royal Botanic Garden, Sibpur.
(8) Dr. D. Chatterjee, M.Sc., Ph.D. (Edin.).

I must acknowledge my grateful thanks to Mr. R. N. De, B.Sc., I.F.S., Forest Botanist, Assam, who is officially in-charge of the publication of this work for going through the proofs, and also to Babu Banka Bihari Syam who has been associated with this publication for a considerable period, as Assistant to Forest Botanist, Assam.

It now remains to acknowledge my thanks and indebtedness to my friend Dr. K. P. Biswas, M.A., D.Sc., F.R.S.E., Superintendent, Royal Botanic Garden, Calcutta, for his ungrudging assistance in various ways.

In spite of repeated proof-reading, it has not been practicable to avoid printer's mistakes, which is very much regretted.

It is a great relief to me that my labours for the last five years (after my retirement) have come to a successful termination, with the publication of this Volume. It will now rest with my successors to take up the Monocotyledons. I have much pleasure in announcing here that the grasses of Assam have been described by Dr. N. L. Bor and it is now passing through the press.

Royal Botanic Garden, Calcutta, A. Das.
The 24th February, 1940.
INTRODUCTION.

Thirty-three families, 184 genera and about 585 species are embodied in this Volume. Phœbes of Assam (Published in the Assam Forest Records, Botany, Vol. II, 1937) which were revised by me, are now reproduced in this work.

The following new species which were discovered in the Shillong Herbarium, Assam, from the region of this “Flora” are also incorporated here.

1. Phœbe goalparensis Hutch var-Boriana Das and var-Martiniana Das.
2. Phœbe Cooperiana Kanjilal ex Das.
3. Machilus globosa Das.
7. Quercus Milroyii Purk.

(Vide the Assam Forest Records, Botany, Vol. II, 1937 and Indian Forester, May 1938).

Machilus dubia and Exceccaria Sp. Nov. could not be described for want of adequate materials, which are being collected now. A new combination of Pasania Milroyia (Purk.) Das has been made by me. In my opinion, the descriptive characters justify transferring the species from Quercus to Pasania.

Mr. C. E. C. Fischer of Kew., Dr. D. Chatterjee, M.Sc., Ph. D., Mr. M. V. Narayanswami and Dr. K. P. Biswas of Royal Botanic Garden, Sibpur, have assisted me in solving many complicated Taxonomical and other problems regarding the species dealt with in this book but it has not been thought advisable to accept all the changes.

I have followed King and Brandis in retaining the generic name Myristica for the whole group but it has been split up into three genera Myristica, Horsefieldia and Knema by
Warburg for the Assam species. Warburg’s specific names have however been mentioned separately.

A new genus *Purkayasthea* (Lauraceae) established by Mr. C. S. Purkayastha and Mr. Narayanswami also finds its proper place.

Hernandiaceae has been put under Calycifloreæ by some botanists but its position under Apetalæ has been retained here.

Full advantage has been taken of the publications on Loranthaceæ by Prof. B. H. Danser, Groningen. He has very kindly examined the Assam sheets and rendered valuable assistance to me for adopting modern names for the Assam species. The genera Hyphaear, Helixanthera, Scurrula, Taxillus, Dendrophtoe, Tolypanthus and Macroselton for Loranthus and Kortalsella opuntia for Viscum opuntia have been introduced in this publication. A new variety of Viscum album, viz-var—meridianum and a new species Taxillus assamicus have been recently identified and described by Prof. Danser from the Assam sheets sent to him but unfortunately they could not be incorporated. I am particularly grateful to Prof. Danser for his valuable co-operation.

The Genus Phyllanthus has been split up into Phyllanthus, Emblica, Kirgenalia, Prosorus, Neo-peltandra, Reidia and Fluggeopsis. There is a good deal of difference of opinion on this subject. I have followed Gamble and Haines as I prefer their classification to others for my purpose.

The generic name *Dryptes* Vahl has been replaced for *Cyclostemon* and *Oreocnide* Miq for *Villubrenea*.

The Genus Quercus has been divided into Quercus Linn and Pasania Oerst as the characters of the section Pasania are quite distinct and justify this adoption.

Ceratophyllaceæ has been omitted although Ceratophyllum Sp. is recorded from Assam.


In describing the Conifers I have followed the classification adopted in the “Handbook of Coniferæ” (Dallimore and Jackson).

It has been realised that the compilation of a work of
such a magnitude should have been undertaken at the Royal Botanic Garden, Sibpur, where adequate facilities are conveniently available for ready reference to complete literature and examination of herbarium specimens. The defects now noticeable in the volumes of the “Flora of Assam” could thus have been undoubtedly minimised.

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FLORA OF ASSAM

APETALÆ.

FAM. 103. NYCTAGINACEÆ.

Herbs less often shrubs or trees. Leaves usually opposite, exstipulate. Flowers hermaphrodite, rarely unisexual, regular; bracts often involucrate, free or connate. Perianth gamophyllous, usually petaloid, lower portion persistent, enclosing the fruit; limb 3-5 lobed; lobes plicate in bud. Petals 0. Stamens hypogynous; filaments usually unequal, inflexed in bud, usually connate at the base; anthers didymous. Ovary 1-celled, free; ovule solitary, erect, basal; style involved in bud. Fruit dry, indehiscent, enclosed in the coriaceous perianth base; albumen soft or flowery. Radical inferior.

A family of very little forest importance. The following plants may however be mentioned:—


A diffuse herb with stout fusiform roots; stems ascending or prostrate, divaricate, thickened at the nodes. Leaves in unequal pairs, the larger 1.7-1 in., the smaller about half the size, ovate or orbicular-ovate, rounded or acute at the apex, glabrous and dark green above, undersurface whitish, with minute scales; petiole slender, variable in length. Flowers very small, dark pink, subsessile or sessile, up to 10 together, sub-capitately arranged on long peduncled dichotomously branched panicles; pedicels capillary; bracts small. Perianth about 1.12 in. long, glandular outside; limb funnell-shaped with 5 vertical bands outside; lobes 5. Stamens
usually 2, slightly exserted. *Fruit* about 1 in. long, 5-ribbed, glandular; embryo hooked, radical long.

A common waste land weed of the plains, (upto 3,000 ft.). The plant is valued, in the indigenous medicine from time imme- morial and is indicated for the treatment of dropsy, jaundice, urino-genital diseases. The tender leaves are eaten as pot herb.

Firs. 4-6. Fr. 7-8.

**Bougainvillea spectabilis** Willd.

A large more or less thorny scrambling shrub with pubescent branches. *Leaves* alternate, 1-2 in. long, elliptic or ovate, acuminate, pubescent; petiole upto 1/2 in. long. *Flowers* in threes; perianth tubular, each adnate to a very conspicuous magenta coloured bract.

A native of Brazil and now commonly grown in gardens where it is trained over trellises, archways, etc. The plant is a perfect blaze of colour when in flower.

**Var. lateritia** has brick red bracts.

**B. glabra** Choisy. Similar to the above; branchlets and leaves glabrous. *Leaves* lanceolate; petiole upto 3 in. long; bracts larger than in the last species.

Commonly grown in the plains.


A large fruticose herb with soft stems with swollen joints, broadly ovate-acuminate leaves, many coloured flowers varying from white and yellow to shades of red and black rugose seeds.

Grown all over the province, often found as an escape.

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**FAM. 104. AMARANTACEÆ.**

Herbs, rarely shrubs or undershrubs, erect or climbing (rarely). *Leaves* opposite or alternate, exstipulate. *Flowers* usually 2-sexual, rarely polygamous or dioecious, small, usually in terminal and axillary simple or panicled spikes, cymes or clusters, the outermost flowers of a cluster sometimes deformed; bracts hyaline or scarious; bracteoles 2, scarious. *Perianth* persistent, usually of 5, free or connate,
scarious or hyaline, segments imbricate in bud. **Stamens** 1-5, opposite the perianth segments; filaments free or connate below or united with intervening membranous staminodes and forming hypogynous cup; anthers 1-2 celled. **Ovary** 1-celled; ovules 1 or more; style usually obsolete, simple or 2-3 cleft. **Fruit** a membranous utricle, rarely an irregularly dehiscing capsule or a berry, often enclosed in or supported by the persistent perianth. **Seed** orbicular or reniform, compressed, embryo annular or curved; albumen mealy, cotyledons linear.

Leaves alternate or alternate and opposite mixed:—
Flowers in spicate racemes not dense, staminodes 0; fruit baccate, glabrous or nearly so. ... ... ... 1. **Deeringia**.
Flowers in dense spikes, staminodes interposed between the stamens; fruit dry, more or less tomentose. ... ... 2. **Ærua**.

Leaves all opposite:—
Flowers in clusters which are arranged in spikes; each cluster containing one perfect and several sterile flowers, which are reduced to single perianth segments with hooked awns. ... ... ... ... ... ... 3. **Cyathula**.
Flowers all perfect, arranged singly in spikes. Sepals spinescent. ... ... ... 4. **Achyranthes**.
Flowers in paniced spikes. Sepals scarious tipped with wool. ... ... 5. **Stilbanthus**.

1. **DEERINGIA** R. Br.


A subscandent or rambling shrub with long weak branches; bark greenish-grey, warty. **Leaves** alternate, 2-5 by 1-2 in., ovate or ovate-lanceolate, acuminate, entire, glabrate, membranous, secondary nerves 7-9 on either side, arched; base often unequal, rounded or narrowed into the petiole, usually abruptly; petiole upto 1 in. long. **Flowers** greenish, close together on spike-like paniced or simple
racemes up to 12 in. long; pedicels filiform, .05-.1 in. long; bracts and bracteoles minute, ovate-acuminate. Perianth of 5 segments each .06-.8 in. long, oblong, scarious on the margins. Stamens 5, exserted, somewhat dilated and united at the base. Style short; stigmas 3, dilated at the tips narrowed downwards; ovules on long funicles from the base. Fruit a globose scarlet, succulent berry, .2 in. across, seated on the spreading perianth; seeds minute, black.

Throughout the area ascending to about 3,000 ft. in the KHASI HILLS.

The leaves and roots are said to be medicinal. The juice of the ripe fruits can be used as substitute for red ink, very pretty when in fruit.

Flrs. 8-10, sometimes earlier. Fr. 11-12.

2. Äerua Forsk.

Äerua scandens Wall.

A subscandent or straggling undershrub with striate pubescent branches. Leaves alternate and opposite, variable in size, usually 1-4 by .5-1.5 in., elliptic or ovate-lanceolate, acute, mucronate, adpressed pubescent in both surfaces, more densely beneath, narrowed at the base into the petiole, which is up to .5 in long. Flowers white with a greenish centre in axillary and terminal ovoid or cylindrical compact spikes .25-1 in. long, often 2-3, sometimes more together, usually forming lax panicles; bracteoles minute, ovate-acuminate, hyaline. Perianth lobes 5, about .1 in. long, lanceolate-acuminate, villous outside, scarious. Stamens 5, alternating with linear staminodes and connate with them below in a cup. Style simple; stigmas 2-fid, capitellate; ovule 1, pendulous from a basal funicle. Fruit a membranous broadly ovate capsule with a coriaceous circumsciss crown.

Plains of ASSAM—Hooker.

Flrs. and Fr. almost all the year round.

3. Cyathula Lour.


A densely tomentose or woolly suberect undershrub, up to 4 ft. in height; stems usually woody at the base; branches
swollen at the nodes. *Leaves* opposite, variable in size, 2-7 in. long, elliptic to elliptic-lanceolate, acute or acuminate; base narrowed or cuneate, adpressed pubescent or glabrate above, silky tomentose beneath; main lateral nerves 6-9 on either side; petiole up to 1 in. long. *Flowers* clustered, clusters collected in dense globose heads 0.5-0.75 in. across, which are arranged on peduncled spikes up to 12 in. long, the lower portion of which is often interrupted; spikes much abbreviated, sometimes consisting of a solitary head when axillary; 1-2 flowers in each cluster, perfect, the rest imperfect. *Bracts* and bracteoles concave, ovate in outline, cuspidate, hairy on the back, 0.1-0.15 in. long. *Perianth* segments of perfect flowers about 0.2 in. long, scarious, linear-lanceolate, 2 or all ending in rigid hooked awns, enlarged in fruit; those of the imperfect flowers reduced to a single perianth segment with hooked awn. *Stamens* 5, alternating with 5 lacerate staminodes and connate with them at the base into membranous cup. *Ovary* obovoid; style simple; stigma capitellate; ovule solitary. *Fruit* an indehiscent, ovoid, membranous utricle, enclosed in the perianth surmounted by the remains of the style; seeds oblong, testa light brown, coriaceous.

KHASI AND JAINTIA HILLS, 2-5,000 ft.
Flrs. 7-8. Fr. 11-12.

*C. prostrata* Blume.

A slender annual herb. *Leaves* elliptic-rhomboid or ovate, 1-2.4 in. long, acute, both surfaces strigosely hispid; petiole very short; sometimes *O. Flowers* pale violet in small drooping clusters arranged in spicate pedunculate racemes. *Perianth* lobes of the 2-3 perfect flowers 5, lanceolate-acuminate, hispid, up to 0.1 in. long; those of the imperfect flowers similar or reduced to hooked awns. *Staminodes* 2-fid or retuse.

KHASI HILLS (3,000 ft.) Clarke (No. 5442) SYLHET, MANIPUR (according to Roxburgh this plant has been introduced from the Moluccas).
Flrs. 9. Fr. 11.

4. *ACHYRANTHES* Linn.
Herbs, sometimes woody below. *Leaves* opposite; petiole entire. *Flowers* 2-sexual in slender simple and pani-
oled spikes, soon deflexed; bracts membranous, spinescent, persistent on the rachis; bracteoles 2, spinescent. Perianth segments 5, shining, lanceolate, aristate, rigid, more or less connate below, ultimately hardened. Stamens 2-5; filaments filiform, connate at the membranous base and alternating with as many square staminodes which are toothed, lacerate or with a toothed scale at the back; anthers 2-celled. Ovary oblong, sub-compressed, 1-selled; style filiform; stigma capitellate; ovule solitary. Fruit an oblong or ovoid utricle; seed oblong, testa coriaceous.

Bracteoles with ovate blade, at least half the length of the awn; staminodes red. 1. A. aspera.
Bracteoles reduced to awns, with minute auricles on either side; staminodes greenish. 2. A. bidentata.


An erect undershrub or herb attaining about 3·5 ft., lower portion perennial; branches pubescent, striate. Leaves opposite, very variable, 1-5 in. long, elliptic-ovate or sub- orbicular, abruptly acuminate, subacute or rounded at the apex, narrowed at the base, softly adpressed hairy on both surfaces or glabrate above; main lateral nerves 6-8 on either half; petiole channelled above, upto 1·5 in. long. Flowers greenish, polished, soon stiffly deflexed, in simple or panicled, pubescent spikes, which elongate in fruit; bracts ovate, aristate, membranous, persistent, reflexed in fruit, upto 1·5 in. long; bracteoles with a hardened base, broadly ovate blade and an excurrent spinescent awn which elongate considerably in fruit 15·2 in. long, deciduous with the perianth. Perianth lobes 5, upto 25 in. long, subequal, lanceolate, with membranous margins. hardened in fruit. Staminodes fimbriate; filaments and fringe of staminodes pink; utricle oblong, about 1 in. long.

A common undergrowth throughout the area ascending to 5,000 ft.
A troublesome undergrowth when in fruit on account of the sharp spiny bracteoles and pungent tips of the perianth which stick to
clothes and prick the skin. The fruiting perianth together with the bracteoles become detached with the fruit while the bract persists.

The plant is valued in Indian medicinal practice for various ailments. The ash yields a large quantity of potash.

Frs. 6-10. Fr. 12.

2. Achyranthes bidentata Blume.

A suberect herb with a perennial and more or less woody rootstock; branchlets striate, pubescent. Leaves 2-5-6 by 1-2-2 in., lanceolate to elliptic, often with undulate margins, acuminate, thinly pubescent to glabrate; lateral nerves 6-9 on either side; petiole up to ·7 in. long. Flowers in terminal and axillary panicled spikes. Bracts ovate, awned, about ·15 in. long; bracteoles often exceeding the bracts consisting of a spinose awn with two membranous auricles at the base. Perianth segments about ·15 in. long, ovate-oblong, acuminate, hardened in fruit; filaments and staminodes greenish, not pink, as in the last species. Utricle oblong, enclosed in the hardened perianth.

Scarcely more than a variety of the last species.
Khasi Hills, probably also elsewhere in the province.

Frs. 6-10. Fr. 7-12.

A. aquatica Br.

A stout aquatic herb. Leaves 2-6 in. long, narrow to elliptic-lanceolate, strigously tomentose, spikes villous, elongating considerably in fruit. Perianth lobes unequal, outer spinous tipped and exceeding the remaining 4, which are not spinose.

Swamps in the plains (Sylhet).
Frs. Rainy season. Fr. 11.

5. STILBANTHUS Hook f.

Stilbanthus scandens Hk. f.

A large woody climber; branches soft, obtusely 4-angled; branchlets silky. Leaves opposite, 4-6 by 2-3 in., elliptic-acuminate, pubescent or glabrate on both surfaces; petiole ·5-1 in. long. Flowers white, shining, in pubescent spikes, 1-3 in. long, arranged in spreading terminal trichotomously
branched panicles; bracts small, ovate, villous; bracteoles usually a little longer. *Perianth* segments 5, ·5 in. long, sacrious, narrowly ovate-lanceolate, bearded outside at the tips. *Stamens* 5, alternating and connate at the base with lacerate staminodes, which are longer than the slender, hairy filaments. *Style* simple; ovule 1, pendulous from a long basal funicle. *Utricle* indehiscent, oblong with villous top.

NAGA HILLS, (upto 5,800 ft.) Clarke (41177 D.), Prain.

Flrs. Rainy season. Fr. 10.


An erect often stout herb attaining 5 ft. in height in some varieties, green or bright pink (in var. tricolor variously coloured). *Leaves* ordinarily 2-6 by ·8-4 in., ovate, oblong or lanceolate, decurrent at the base into the petiole, glabrous. *Flowers* 1-sexual, small in clusters, congested on the axils or forming simple more or less interrupted spikes. *Bracts* about ·15 in. long, hyaline, awned; bracteoles somewhat shorter. *Perianth* segments about ·15 in. long, awned, those of the male flowers shorter. *Stamens* 3; seed solitary, compressed, black.

The plant has many varieties and local races; the leaves are used as pot herb and the young stems as vegetable, being eaten like *Asparagus*.

*A caudatus* Linn. Love-lies-bleeding.

An erect herb with elliptic-obtuse leaves; spikes arranged in drooping crimson or yellow panicles.

Commonly grown as an ornamental plant.

Some varieties of this plant are grown for their leaves, which are eaten as *sag* and also for the farinaceous seeds in N. W. INDIA.


An erect glabrous much branched weed armed with sharp axillary spines. *Leaves* upto 3 in. long, ovate or oblong-lanceolate, cuneate at the base. *Flowers* 1-sexual in axillary clusters, and in terminal and panicled or simple axillary spikes. *Bracts* exceeding the perianth segments, awned; perianth segments 5.

Very common.

The tender shoots are eaten.

Flrs. and Fr. almost throughout the year.

*A. hypochondriacus* Linn. The Prince's feather.

A handsome plant with crimson stems, leaves and flowers. Cultivated as an ornamental plant in gardens.
**Celosia argentea** Linn.

An erect glabrous annual 1-3 ft. high with linear or lanceolate 1-5 in. long and white, pink scarious flowers in spikes. A common waste land weed originally introduced. Seeds are officinal being an efficacious remedy in diarrhoea.


*Leaves* broad, spikes often much developed curiously branched and monstrous, purple, pink or yellow. Commonly cultivated in gardens. The flowers are considered astringent and are used in diarrhoea and in excessive menstrual discharges.

**Gomphrena globosa** Linn. The Globe Amaranth.

*Flowers* in dense globose many coloured heads. Often grown during the rainy season for the bright coloured flower heads which range from yellowish white through various shades of red to purple.

**Telanthera ficoidea** Moq.

A native of Brazil, often used for edgings in garden beds. *Leaves* small, close, opposite, often coloured red or purplish.

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**FAM. 105. CHENOPODIACEÆ.**

Herbs or shrubs, often fleshy and glaucous. *Leaves* usually alternate, simple, exstipulate. *Flowers* small, often dimorphic, 1 or 2 sexual, usually green and regular; bract 1 or none; bracteoles 1 or 2. *Perianth* persistent, often accrescent in fruit of 3-5 free or connate lobes, imbricate in bud, sometimes wanting in female flowers. *Stamens* usually 5, opposite the perianth segments; perigynous or hypogynous; filaments free or connate at the base, sometimes with intraveneing staminodes. *Ovary* 1-celled; style terminal, long or short; stigmas 2-5, free or slightly united, less often solitary; ovule solitary, basal or lateral. *Fruit* usually an utricle, rarely capsular, often enclosed in the enlarged sometimes fleshy perianth. *Testa* of seeds crustaceous, coriaceous
or membranous; endosperm floury, fleshy or 0; embryo usually peripheral, surrounding the endosperm.

**Chenopodium ambrosiodes** *Linn.* Mexican tea.

An erect branchy, strongly smelling undershrub or perennial herb attaining about 4 ft., with sulcate glandular-hairy and minutely cobwebby pubescent stems. *Leaves* smaller upwards, lower attaining 2.5 in., oblong or lanceolate, obtuse, sinuate-toothed, upper entire; base decurrent into the short petiole. *Flowers* minute, sessile, clustered on axillary and terminal simple or panicled spikes in the axils of foliaceous bracts, which increase in size downwards, the whole of the upper portion of the plant being converted into a leafy panicle when flowering. *Perianth* segments usually 4-5, rarely 6, elliptic-acute, connate below, valvate, incurved. *Stamens* 4-6, hypogynous. *Ovary* globose; stigmas 3-5, very minute. *Utricle* enclosed by the persistent perianth; seed brown.

**NOWGONG,** **SYLHET,** **KHASI** and **JAINSTIA HILLS,** in low elevations and probably throughout the province.

The plant is said to yield an essential oil which is regarded as tonic and antispasmodic. It has a reputation as a useful remedy in nervous affections.

Flrs. & Fr. almost all the year round.

**C. album** *Linn.* Vern. *Bathuagsak,* Beng.

An erect herb usually coated with a mealy substance, stems and inflorescence sometimes tinged with purple or red. *Leaves* very variable, smaller upwards, the lower attaining in cultivation 4-6 in. in length; oblong-lanceolate to rhomboid-lanceolate, more or less toothed or lobulate. *Flowers* minute, bisexual, green in spikes, which are usually panicled.

A weed of cultivation ranging to the hills, also sometimes cultivated.

The leaves are eaten as pot herb and are said to be rich in mineral matters specially potash and also contain a considerable amount of albuminoids and other nitrogenous compounds.

Flrs. & Fr. 3-6 according to elevation.

**Beta vulgaris** *Linn.* The beetroot. Vern. *Beetpalang,* Beng.

The well-known vegetable developing large edible red root in cultivation. *Leaves* oblong, ovate or rhomboid-ovate, obtuse; base decurrent on the petiole. *Flowers* 2-sexual, in distant clusters, with narrow bracts arranged in leafy panicled spikes.

Often cultivated.

A variety described as a species by Roxburgh—*B. bengalensis* Roxb. and with white, rather stringy roots is the country spinach.
Vern. *Palang* which is largely grown for the leaves, which are eaten as vegetable.


A well-known vegetable with deltoid ovate, or pinnatifidly lobed leaves. *Flowers* ebracteate, dioecious. *Fruit* prickly or smooth; utricle adnate to the perianth.

Often cultivated in gardens.


A stout erect annual with glabrous striate stems. *Leaves* up to about 2.5 in. long, ovate or upper triangular, obtuse. *Flowers* monoeious; female without perianth; utricle membranous, enclosed in the hardened bracteoles.

Cultivated and prized as a vegetable in the KHASI HILLS and also in many districts in the plains.


A glabrous climber with fleshy twining stems often tinged with red. *Leaves* 2-5 in. long, broadly ovate to orbicular, shining. *Flowers* 2-sexual, red or white in lax peduncled spikes 1-6 in. long; each with a small green bract and 2 adnate fleshy bracteoles. *Utricle* size of a small pea, included within the fleshy perianth which is black with red or purplish juice.

Cultivated, often apparently wild near hedges. It is largely used as a vegetable.

**Boursingaultia baselloides** Kunth.

A glabrous, often extensive twiner; old stems warty bearing ovoid tubercled bulbils; herbaceous portions of stems dying back every year. *Leaves* 1.5-3 in. long, fleshy, broadly ovate, acute or sub-acute, fleshy; base sub-cordate or cuneate, decurrent at the base to the short petiole. *Flowers* white, 2-sexual, about 2 in. across, faintly scented, in terminal and axillary elongate lax, paniced or simple spike-like racemes; bracts subulate, shorter than the pedicels; bracteoles ovate, hyaline, connate into a cup. *Perianth* consisting of an outer whole of 2 sepal, adnate to an inner corolline whorl of 5 segments connate at the base, elliptic; stamens 5, perigynous; style with 3 capitellate stigmas. *Fruit* not seen.

Introduced from S. AMERICA and now wild near habitations in Shillong.

Very ornamental when in flower, masses of white sprays of which cover the supporting object. The fleshy leaves are used as a vegetable.
Acroglochin chenopodioides Schr.

An erect glabrous annual. Leaves alternate, 1-1.5 by 4-6 in., elliptic-lanceolate, sharply denticulate, acute or acuminate; base acute; petiole 2-4 in. long. Flowers minute, clustered in axillary cymes; perianth segments 5, sub-acute, green. Stamens 1-3; filaments dilated below. Ovary depressed; style short; stigma 2, subulate; ovules erect. Utricle disciform.

Khasi and Jaintia Hills, (Shillong Peak 6,000 ft.).

Flrs. Rainy season. Fr. Later.

FAM. 106. PHYTOLACCACEÆ.

Trees, shrubs or herbs. Leaves alternate, entire; stipules small or 0 or reduced to tubercles. Flowers usually in racemes, bracteate, 2-bracteolate. Perianth 4-5, imbricate, petaloid or sepaloid, sometimes unequal. Stamens 4-5 or more; filaments free or slightly connate at the base; anthers deciduous, 2-celled. Ovary usually superior; ovule solitary in each carpel or 1 or small; carpels free or connate. Fruit fleshy or dry, baccate or samaroid or utricular. Seeds erect, often arillate; albumen fleshy; embryo peripheric.

PHYTOLACCA Linn.

Phytolacca acinosa Roxb. Vern. Ja'ong, Kh.

A succulent herb. Leaves 2-7 by 6-2.5 in., elliptic or obovate, acuminate, entire, membranous, narrowed into the petiole, 3-1 in. long. Flowers 1-2 sexual in peduncled racemes; perianth sepaloid. Ripe fruit (carpels about 10) blue-black.

Khasi & Jaintia Hills, (upto 5,500 ft.).

The leaves are eaten cooked as a spinach.

Flrs. & Fr. 5-8.
FAM. 107. POLYGONACEÆ.

Herbs or shrubs, rarely trees. Leaves alternate, rarely opposite, usually entire, sometimes serrulate; stipules usually membranous and forming a tube encircling the stem (ochrea). Inflorescence axillary, racemose, spicate, capitate or paniculate. Flowers usually bisexual, joined on the pedicel; perianth segments 3-6, free or somewhat connate, imbricate in bud, persistent. Stamens usually 5-8, rarely more or fewer, perigynous. Disk annular, glandular or absent. Ovary free, 2-4 gonyous or biconvex; styles 1-3; stigmas various, usually capitate; ovule 1, orthotropous; but hard, usually 3-(rarely 4-) gonyous or biconvex, usually included in the perianth. Seed erect with membranous testa and flouy or sometimes miniate albumen. Radicle superior.

Perianth segments 3-5; stigmas capitate:—
Stamens 5-8 or fewer; nut enclosed in the perianth or slightly extruded; cotyledons flat. ... ... ... ... 1. Polygonum.
Stamens 8; nut much extruded; cotyledons plaited. ... ... ... ... 2. Fagopyrum.
Perianth segments 6; stamens 6; stigmas fimbriate. ... ... ... ... 3. Rumex.

1. POLYGONUM Linn.

Herbs or shrubs. Leaves alternate, entire, rarely lobed; stipules tubular, usually membranous, sometimes herbaceous, rarely minute and 2-fid. Flowers 2-sexual, small or minute, clustered, clusters axillary or terminal, or in spiciform, often panicled or sometimes capitate racemes. Bracts and bracteoles ochreate. Perianth 4-5, rarely 3-cleft. 2 outer segments smallest. Stamens 5-8, perigynous, usually with minute yellowish glands between the bases of filaments (disk); anthers often pink or purple. Ovary compressed or trigonous; styles 2-3; stigmas capitate. Nut included in the more or less accrescent perianth or slightly extruded, biconvex or trigonous, brown or black usually polished.
107. **Polygonaceae**

I. Unarmed:—

A. Flowers in axillary clusters; perianth 5-cleft; stamens 8; styles 3, nut trigonous. A low undershrub or herb. .. 1. *P. plebejum*.

B. Flowers in racemes:—

1. Racemes slender:—
   Stamens 5; styles 2, hooked, nut flattened, more or less hairy tall plant with herbaceous stems. .. 2. *P. virginianum*.
   Stamens 6-8; styles not hooked; nut biconvex, not flattened. Entire plant glabrous. A stout herb with woody rootstock. .. 3. *P. glabrum*.

2. Racemes spiciform, dense:—
   A scapigerous perennial herb with a woody rootstock. .. 4. *P. paleaceum*.

C. Flowers clustered in heads:—

1. Peduncles corymbosey arranged or panicled:—
   A climber, or erect or rambling shrub. .. 5. *P. chinense*.

2. Peduncles 1-3 together, terminal or axillary:—
   (a) Stem creeping on rocks and banks and rooting adventitiously. .. 6. *P. capitatum*.
   (b) A herb about 2-3 ft. high, with woody rootstock. .. 7. *P. microcephalum*.

D. Flowers in large terminal and axillary panicles; shrubby plants. Entirely glabrous; nut included within the perianth. .. 8. *P. paniculatum*.

1. Hairy plants:—

2. Branches and petioles strigose with deflexed hairs, undersurface of leaves not silky; investing hairs somewhat harsh, nut not included in the perianth. .. 9. *P. rude*.

Hairs on the branches and petioles never deflexed; undersurface of leaves silky; investing hairs soft; nuts included. .. 10. *P. molle*.

II. Armed with recurved prickles:—

Climber or with rambling stems. Leaves peltate; stipules foliaceous. .. 11. *P. perfoliatum*. 

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*Polygonum.*
1. **Polygonum plebejum** Br.

An undershrub or herb attaining about 2 ft. with many sub-erect or prostrate stems; branches striate, terete, glabrous or strigillose along the striations when young. *Leaves* very variable, usually 2-1.2 in. long, linear or linear-oblong, acute or obtuse, margins often revolute; lateral nerves obscure, sessile or nearly so; stipules lacerate to more than half the length and fimbriate. *Flowers* about 1 in. long, pink or greenish, axillary, solitary or 2-4 together, sessile or shortly pedicellate. *Perianth* 4- or 5-partite. *Nut* triquetrous, shining.

Throughout the area.
A very variable plant, with many varieties.

Flrs. 3-7. Fr. 11.

2. **Polygonum virginianum** Linn.

A tall sub-herbaceous plant 2-5 ft. or more in height with hollow stem and woody rootstock; young shoots hispid. *Leaves* thin, 4-7 by 1.5-3 in., sometimes larger, elliptic or elliptic-lanceolate, acuminate, narrowed or acute at the base, thinly clothed with long stiff adpressed hairs on both surfaces, margins ciliate; lateral nerves 9-11 on either side; petiole 4-7 in. long; *stipules* hirsute with spreading hairs upto 5 in. long. *Flowers* red, in slender often branched terminal or simple axillary racemes 6 to 16 in. long; bracts ciliate, about 15 in. long, basal portion tubular; pedicels rigid and stout in fruit. *Perianth* 4-partite, thin, 15 in. long, elliptic or ovate, obtuse, eglandular. *Stamens* 5; styles 2, free, rigid, hooked, persistent and extruded in fruit. *Nut* flattened, ellipsoid, 0.08 in. long.

Nongstoin, 5,000 ft. KHASI and JAITIA HILLS, rare, NAGA HILLS, Piphima, 3,000 ft.—Clarke.

Flrs. Rainy season. Fr. Cold season.

3. **Polygonum glabrum** Willd.

A stout erect herb with woody rootstock. *Leaves* mostly 3-6 in. long, lanceolate or linear-acuminate, tapering at the base, glabrous, secondary nerves many; petiole short;
stipules not ciliate, tubular, 1-1.3 in. long. *Flowers* pink or white in slender usually glabrous, spiciform, panicled racemes, 1.5-3 in. long; bracts tubular, truncate or oblique, rounded; pedicels slender, 5-6 together in the axils of bracts. *Stamens* 6-8. *Styles* usually 2; nut biconvex, rarely trigonous.

Edges of nalas, and ditches "from ASSAM, SYLHET and BENGAL to the INDUS." There are no specimens at Calcutta from our area.

Flrs. 4-5. Tr. 10-1.


A scapigerous perennial with stout rootstock about .6 in. across. *Caulline* leaves 2.5-9 in. long, linear-oblong or lanceolate or oblanceolate, acute or obtuse, crenulate, glabrous or thinly hirsute beneath, nervules prominent, close and furcate near the margins; base attenuate to the long slender petiole, which is 1-3 in. long; stipules tubular, ciliate, up to 1.5 in. long. *Flowers* pink, about .12 in. long, crowded in cylindric spiciform racemes, about .4 in. across and .6-2 in. long, solitary at the end of leafy scapes, 6-16 in. high; bracts ovate-lanceolate, mucronate or shortly awned; pedicels capillary, elongating with age up to .15 in. long; perianth-segments 5; stamens usually 8; styles 3; nut trigonous.

**KHASI HILLS,** 4-6,000 ft. common in open grass lands.

Flrs. most of the year mainly 3-11.


A shrub with herbaceous shoots and woody base, often scrambling among bushes or in var. *khasyanum* a climber with woody stems reaching tops of trees; branches with glandular hairs, hispidulous, specially at the nodes, or glabrate, striate. *Leaves* very variable, 1-6 by .6-3.5 in., oblong-lanceolate to ovate-oblong, deltoid-ovate or elliptic, acute or acuminate; base truncate, rounded or sub-cordate, but often abruptly cuneate and decurrent on the petiole of the upper leaves, sometimes amplexicaul, margins entire or sometimes glabrous, minutely crenulate or serrulate, more or
less hairy or hispidulous on the nerves beneath; lateral nerves ordinarily 6-10 on either side, sometimes more, with many intermediates, prominent beneath; petiole ·25-·5 in., pubescent, hispidulous or glabrate, usually unequally auricled at the base, auricles rounded, deciduous, unto ·7 in. across, one or both sometimes suppressed; stipules with an obliquely truncate tube and a long and pointed apical portion. Inflorescence of peduncled heads arranged corymbosey or in panicles; peduncles hispidulous or glandular, specially near the flower heads or sometimes glabrate unto ·6 in. long; bracts of the flower clusters scarious, not ciliate, glabrous or hispidulous; heads ·2·3 in. across. Perianth segments 5, white or pink, sub-equal, yellowish glands on either side of the filaments. Style 3-fid. Nutlets trigonous; fruiting perianth fleshy or dry.

Throughout the area.

The plant is very variable. The following varieties, which roughly indicate the degree of variation in our area may be mentioned. These are not constant as intermediate forms occur. P. chinense proper. Stems weak. Leaves usually 1-3 in. long, sometimes larger, broadly lanceolate, or deltoid-oblong; base often truncate or subcordate with a wedge on the petiole, glabrous or nearly so. Peduncles stout, glabrous or glandular.

NOWGONG—Simons; SYLHET and CACHAR, Keenan, Wallich 1707A. NAGA HILLS, Prain; MISHMI HILLS, Griffith; KHASI HILLS, Barapani.

Flrs. 9-12.

Var. ovalifolia Meissn. Leaves 3-6·5 in. long, broadly oval or elliptic, glabrous or pubescent on the nerves beneath; peduncles conspicuously glandular not slender—KHASI HILLS.

Var. scabra Meissn. Leaves roughly hairy on both surfaces, hairs on the branches deflexed; peduncles glandular, often pinkish, not slender—KHASI HILLS—Shillong.

Var. corymbosa. Erect shrub; leaves oblong-lanceolate; heads large—KHASI HILLS, NAGA HILLS.

Var. subhastata Meissn. Leaves sometimes very long, oblong or lanceolate; base subhastate or cordate, hispidulous on the nerves beneath, heads small.

KAMRUP, KHASI HILLS, Dibrugarh.

Var. brachiata. Leaves 3-6 in. long, oblong-lanceolate to ovate-oblong, acuminate, glabrous or hispidulous on the nerves beneath.
Panicles glandular and hispidulous, lax; ramifications brachiate, slender; heads small, few-flowered.

KHASI HILLS, SIBSAGAR. GARO HILLS—Mann., SYLHET, CACHAR, LAKHIMPUR—Clarke.

Var. khasyana? Stem stout, woody, about 0.7 in. across reaching tops of tall trees. Leaves 3-5-7 by 1.6-2.2 in., oblong-ovate or lanceolate, acuminate; base subcordate or subtruncate, margins usually minutely crenulate, coriaceous, glabrous above, hispidulous along the midrib and sometimes along the lower lateral nerves; midrib often red above; stipules larger than in other forms 1.5-2 in. long. Panicles lax; peduncles slender, glandular and hispidulous; heads few flowered, small.

KHASI HILLS—cool situations.

Flrs. 7-12.

6. Polygonum capitatum Ham.

A perennial creeping herb or undershrub with woody rootstock; stems adventitiously rooting, often reddish brown, shoots hairy; hairs brown. Leaves 0.5-1.5 by 0.3-1 in., ovate to ovate-elliptic, acute or subacute, entire, thinly hairy on both surfaces or glabrescent above, margins ciliate; petiole 0 or very short, unequally auricled at the base; stipules tubular, hairy. Flowers small, pink or purplish, in dense peduncled capitulate heads, 0.25-0.5 in. across; peduncle 1-3 together, 0.5-1.2 in. long, glandular at least near the top; bracts ovate-lanceolate, acute. Perianth 5-partite; stamens 8. Nut trigonous, black.

KHASI AND JAINTIA HILLS, 3-6,000 ft.; NAGA HILLS; MANIPUR; trailing on rocks and banks.

Flrs. & Fr. almost all the year round.

7. Polygonum microcephalum Don.

A glabrous or sparsely hairy herb attaining 3 ft. with a woody, perennial root stock. Leaves 3-5 in. long, hastately ovate-lanceolate or oblong-acuminate, abruptly narrowed to the winged petiole, which is sometimes auricled at the base. Flowers in small heads 0.25-0.3 in. across in axillary or subterminal, glabrous, slender peduncles. Perianth 5-cleft; stamens 8. Styles 2-3, connate below. Nut 3-gonous.
Polygonum. 107. POLYGONACEÆ. 19

KHASI HILLS, upto 5,000 ft.; NAGA HILLS, Prain; N. C. HILLS (Haflong), Craib. SIBSAGAR, Masters; SYLHET, Wallich; ASSAM, Fischer.

Frs. 6. Fr. 8-9.

8. Polygonum paniculatum Bl.

A spreading scrambling shrub attaining about 8 ft., all parts glabrous, stems woody below; branches flexuous, terete. Leaves 5-7 by 2-3 in., elliptic-ovate or caudate-acuminate, entire, margins often ciliolate; lateral nerves 12-24 on either half with smaller ones between; base subcordate, rounded or narrowed; petiole ·4-1 in. long; stipules with a long limb, lanceolate. Flowers about ·1 in. across, white in lax terminal and axillary often leafy panicles; pedicels slender, short; bracts minute, obtuse. Perianth 5-partite; segments oblong; nut small, trigonous, black, enclosed within the fleshy perianth, which attains about ·15 in. in fruit.

NAGA HILLS—Kohima—Prain.

Frs. & Fr. 8-10.


A tall bushy herb or shrub with herbaceous branches attaining 8 ft. in favourable situations; branches stout, strigose like the petioles with deflexed hairs. Leaves 3-6.5 by 1-2.5 in., elliptic-lanceolate or lanceolate-acuminate, margins entire, ciliate, pubescent on the midrib and glabrate or thinly pubescent elsewhere above, pubescent specially along the nerves beneath, with spreading hairs; lateral nerves 15-30 on either half, fewer on imperfect leaves, arcuate; base acute or narrowed; petioles up to ·7 in. long; stipules usually strigose with long adpressed hairs; basal portion persistent, upper deciduous, up to 1.7 in. long. Flowers small, about ·15 in. across, white, somewhat lax, sometimes leafy, in terminal or axillary panicles, laxly hirsute with long flexuous hairs; pedicels about ·1 in. long, occasionally few longer than others, slender. Bracts whitish about ·15 in. broad, rounded. Perianth 5-cleft; segments elliptic-oblong. Stamens 8, alternating with 8 round perigynous glands.
styles 3. Nutlet about .17 in. long, trigonous, slightly exceeding the perianth, which becomes sometimes fleshy.

Common above 4,000 ft. in KHASI HILLS.

Frs. & Fr. 7-12, also at other times of the year.


A subscendent or straggling bushy shrub often with zigzag stems; branches clothed with erect (never deflexed) adpressed hairs. Leaves 3-6 by 1-2·2 in., lanceolate to elliptic-lanceolate, acuminate, margins ciliate; lateral nerves 10-25 on either half, pubescent on the midrib and glabrate or thinly pubescent elsewhere above, undersurface silkily villous when young, less densely silky with age; petiole silky-villos, about .7 in. long; stipules clothed with long, spreading silky hairs, deciduous with the exception of a small basal portion. Flowers white, about .15 in. across in terminal and axillary somewhat lax panicles, hirsute with long flexuous hairs; bracts small, hairy, rounded; pedicels upto .1 in. long. Perianth as in the last species. Nutlets 3-gonous, included in the usually fleshy perianth.

KHASI HILLS—4-6,000 ft.

Closely resembling the last species, but is more softly and silkily hairy on the undersurface of the leaves, the hairs on the stems are never deflexed; the nut is included.

Frs. 5-8. Fr. 10-11.


A prickly climber or rambling shrub; stems herbaceous except towards the base; branches and petioles armed with sharp recurved, prickles. Leaves 1-3 in. across, peltate, deltoid, with obtuse or subacute angles, membranous, glabrous and pale green above, glaucous green beneath, midrib and nerves beneath sometimes prickly, basal nerves 3-5; petiole slender, a little longer than or as long as the blade; stipules foliaceous, .5-1·5 in. across, orbicular, amplexicaul. Flowers white, about .12 in. long, in short terminal and axillary simple racemes attaining about 1·2 in.; peduncles sometimes with
few prickles; bracts membranous, broad, rounded, glabrous. *Perianth* segments 5, broadly elliptic, rounded. *Stamens* 8; styles connate below. *Nut* globose, obscurely 3-gonous, black, about 0.2 in. long, enclosed in the often fleshy perianth.

The basal portion of the plant is perennial, upper portion die back every year.

**KHASI HILLS** up to 5,000 ft. **SIBSAGAR, SYLHET—Wallich**, probably in other districts as well.

Fls. & Fr. 7-10.

**P. arifolium** Linn.

Herbaceous; stem slender, flaccid. *Leaves* 2-2.5 by 0.9-1 in., hastate-acuminate, membranous, almost glabrous, sparsely setose along the nerves beneath; base truncate; petiole about 1 in. long; stipules ridged, ciliolate. *Heads* small, few flowered. *Perianth* 5-cleft. *Stamens* 5. *Nut* trigonous, ovoid.

**KHASI HILLS.** (6,000 ft.)

Fls. 8.

**P. praetermissum** Hk. f.

A small glabrous herb. *Leaves* 1-2 by 0.3-0.4 in., linear-oblong, bluntly acuminate, sagittate, glabrous; petiole about 0.5 in. long. *Stamens* 5. *Nut* puncticulate.

**KHASI HILLS** (5,000 ft.) **SYLHET** (Wallich).

Fls. 5.

**P. campanulatum** Hk. f. Var. fulvida.


**NAGA HILLS** (10,000 ft.)

Fls. & Fr. Autumn season.

The following species are also recorded from the region of this flora:—**P. alatum** Buch-Ham., **P. assamicum** Gandoger, **P. barbatum** Linn., **P. flaccidum** Meissn., **P. Hydropiper** Linn., **P. lanigerum** Br., **P. lepatifolium** Linn., **P. macranthum** Meissn., **P. Meeboldii** W. W. Smith., **P. minus** Huâs., **P. muricatum** Meissn., **P. orientale** Linn., **P. palmatum** Dunn., **P. pedunculare** Wall., **P. Posumbu** Ham-Buch., **P. runcinatum** Linn., and **P. sagittatum** Linn.
2. FAGOPYRUM Cærtn.


A tall, branching herb with a perennial base. Inflorescence petiole and leaves along the nerves thinly pubescent or puberulous. Leaves 2-4 in. long, upper smaller, deltoid, or triangular, shortly acuminate, often with short acute or obtuse basal lobes, sagittate or cordate at the base, secondary nerves digitately spreading from the base and incurved upwards; petioles slender, up to 5 in. long. Flowers small, white, recurved on the branches of terminal and axillary paniculate cymes. Perianth 5-partite; segments about .15 in.; stamens 8; ovary 3-gonous; styles 3; nut extruded.

KHASI HILLS, 4-5,000 ft. A common weed. The leaves are eaten cooked as vegetable.

Frs. 7-11.


A glabrous annual attaining 3 ft. Leaves 1-4 in. long, triangular-cordate. Flowers white or pink in dense subcapitate cymes. Cultivated in KHASI HILLS. The nuts are ground into flour and made into bread. The pink flowers are said to be sterile.

3. RUMEX Linn.

Rumex nepalensis Spreng.

A robust herb with stout perennial rootstock. Leaves 5-7·5 by 2-3·5 in., upper smaller, oblong or elliptic-ovate, cordate, lower ones long stalked, upper nearly sessile. Flowers 2-sexual, small, green in whorls arranged on long racemes. Perianth 6-partite; margins fringed with usually hooked setæ, all persistent, the inner 3 enlarged and coriaceous in fruit, 1-2 of which develop an oblong tubercle on the midrib; stamens 6; ovary trigonous; styles 3 with fringed stigmas. Nut brown.

Common near water and in waste lands usually in fresh soils.

Flrs. 5-10.


A rather fleshy pale-green annual. Leaves 1-3 in. long, elliptic-ovate or oblong, cordate, hastate or cuneate and 3-5 nerved at the base; petiole long. Flowers monoeious; inner perianth segments membranous, reticulate, often pink, without teeth or tubercle. Cultivated throughout the area as a vegetable. It is pleasantly acid when cooked and is also used medicinally.
Rheum Rhaponticum *Linn.* The rhubarb is cultivated in the KHASI HILLS as a vegetable; the petiole of the leaves is eaten.

Antigonon Leptopus *Hook & Arn.* Sandwich Island creeper or coral creeper.

A large handsome evergreen climbing shrub; branchlets and rachis of inflorescence often passing into tendrils. *Leaves* alternate, the lower 7 by 4 in., upper smaller, ovate-acute; nerves impressed above; base cordate with rounded basal lobes, somewhat rugose; petiole up to 1·5 in. long; stipules consisting of a raised line round the stem. *Flowers* about 1·5 in. across, white or pink, in panicles. *Perianth* segments 5, 2 inner smaller; stamens 8, connate towards the base into a ring, with short teeth between the filaments. *Ovary* 3-gonous, with 3 free styles.

A native of TROPICAL AMERICA. Cultivated in gardens in the plains as an ornamental plant for covering trellises, arches, etc.

Flrs. Rainy and Cold season.

Muehlenbeckia platyclada *Meissn.*

A glabrous shrub with all the branchlets converted into flattened phylloclades, appearing as if jointed, bearing in the rains alternate fleshy rhomboid leaves about 1 in. long, which soon fall off. *Flowers* small, green and white in sessile clusters at the nodes. *Perianth* segments 5. *Stamens* 8-9; ovary 3-gonous; stigmas 3, fimbriate.

Often cultivated in gardens as an ornamental plant in the plains. A native of Solomon Islands.

FAM. 108. PODOSTEMONACEÆ.

Acquatic herbs (submerged) growing on stones in fresh water, usually annual. *Leaves* simple, delicate, distichous, usually sheathing. *Flowers* 2-sexual, regular and 3-merous with a perianth or zygomorphic and bimerous without one. *Stamens* hypogynous; filaments few or partially connate; anthers 2-celled. *Ovary* 2-3-celled; ovules numerous, anatropous; stigma 2-3. *Capsule* usually stipitate, septicidal or septifragal. *Seeds* numerous, minute; testa mucilaginous; albumen 0, embryo straight; radicle inferior.
Hydrobryum Griffithii Tul.

A small green herbaceous frondose plant, growing on stones. Flowers bisexual, enclosed in a spathe. Perianth 0. Stamens 2; stigma 2, subsessile. Capsules stipitate, valves 5-ribbed.


H. lichenoides Kurz. also occurs in the region of this flora (D. Chatterjee).

PODOSTEMON Michaux

Podostemon Wallichii Br. Small herb about 1 in. long. Stem frond-like, 2-sexual, zygomorphic, sessile in a spathe. Stamens 2, staminode 2 or a third arising from the fork of the filament. Ovary ellipsoid, 2-celled. Fruit ribbed, narrowed into the stalk, valves persistent, incurved.


P. pterophyllus Benth and P. minor Benth are also recorded from the region of the flora.

The generic name is now known as Dicraea (Tul).

FAM. 109. NEPENTHACEÆ.

Carnivorous plants (shrubs or undershrubs) prostrate, erect or scendent, evergreen. Leaves alternate, exstipulate, consisting of a basal lamina, with excurrent tendril-like midrib which bears a pitcher of various forms, pitcher with 2 longitudinal ribs or wings in front at first closed by a lid which later on arches over the orifice of the pitcher, inner surface of pitcher glandular below the middle and adapted for trapping insects, mouth with revolute, closely ribbed margin (peristome). Inflorescence a terminal or lateral raceme or cyme, rarely panicled. Flowers dioecious, regular,
small, green or brownish. *Perianth* 4, rarely 3-partite; segments in decussate pairs, glandular and nectariferous within. **Male flowers**—Stamens monadelphous; anthers 4-24, usually 8-12, collected into a globose mass, extrorse. **Female flowers**—Ovary superior, 3-4 celled, usually hairy; ovules numerous; style short or 0; stigma discoid, 3-4 lobed. *Fruit* a coriaceous loculicidal capsule. *Seeds* very numerous, minute, albuminous; testa membranous, produced into a filiform wing at either end; embryo straight.

**Nepenthes** Linn.


An undershrub with short stout prostrate stem. **Lamina** of leaf 9-24 by 1·15-3·5 in., sessile, lanceolate, acute or acuminate; base narrowed and attenuate, amplexicaul; lateral nerves many, ascending, close, subparallel; pitchers on long tendrillar stocks 5-8 by 1·5-3 in., sub-cylindric, green reddish above, inflated above the base, mouth somewhat contracted, glabrous, mebranous, young shortly winged; lid membranous, closely glandular dotted. **Racemes** peduncled, robust, puberulous to tomentose, up to 26 in. long including the 9 to 10 in. long peduncle; cymes pubescent, usually 2-flowered; pedicels 25·35 in. long, slender. **Flowers** greenish-red, 3·4 in. across, perianth-segments 4, elliptic or elliptic-oblong, pubescent outside, glabrous within. **Staminal** column red. **Ovary** pubescent. **Capsule** elongate, ovoid-oblong, 75-1 by 25·3 in., seated in the persistent perianth.

**Garo Hills**, Tura forests, **Khasi & Jaintia Hills**, Nonghulen 4,000 ft. Jarain, Longrien. Found in abundance in the southern parts of Garo Hills—R. N. De. The pitcher is rubbed into a paste, insect and all, and given to cholera patients mixed with water.

Frs. 6. Fr. 9-10.
FAM. 110. CYTINACEÆ (Rafflesiacæ).

Fleshy parasites on the roots, stems and branches of various plants. Leaflets or leaves scale-like. Flowers often large, solitary, rarely spicate, didymous by abortion, rarely polygamous or 0; perianth more or less epigynous, segments 4-10, imbricate or rarely valvate. Stamens innumerable; anthers sessile, arranged in 1-3 series on a fleshy central column, 2-celled, brushing by slits or pores. Ovary inferior or semi-inferior or 1-celled or the placenta reaching nearly into the middle; stigmas various; ovules very numerous. Fruit fleshy. Seeds minute, very numerous; endosperm cellular; embryo minute.

Sapria himalayana Griff.

Dioecious. Buds globose; bracts white and pink. Flowers fœtid, usually 5-6 in. across; (upto 1'-2'' in. across, N. L. Bor) tube blood red within; segments fleshy, warted; anthers about 20. Ovary traversed by longitudinal sinuous cells; stigma a papillose cone in the centre of the disc. Fruit swollen, crowned with the perianth,


Frs. 12.

FAM. 111. ARISTOLOCHIACEÆ.

Climbing herbs or shrubs, rarely erect. Leaves alternate, exstipulate, simple, entire or lobed, base of petiole often dilated, sometimes decurrent. Flowers 2-sexual, zygomorphic or rarely regular, solitary, racemose or in cymes, bracteate or not. Perianth superior, petaloid, gamophyllous, variously shaped; lobes valvate. Stamens 6 or more in 1 or 2 series around the base of the style with which they are combined into a column or free; anthers 2-celled, extrorse.
Ovary 4-6 celled, placentas parietal, meeting on the axis or free; style thick, short, divided into 3 or more stigmatic lobes at the top; ovules numerous in each cell. Fruit capsular, rarely indehiscent, usually dehiscing from base upwards; seeds numerous, 3-sided or flattened; endosperm copious, fleshy; embryo small.

**ARISTOLOCHIA** Linn.

Shrubs or perennial herbs, usually climbing. Leaves entire or lobed, often with a stipule-like leaf of an undeveloped bud in the axil, otherwise exstipulate. Flowers solitary, fascicled or racemose in the leaf axils; bracts at the base of flowers often large. Perianth very variable in shape, size and colour; the tube usually inflated below, then contracted in a cylindrical neck, and again expanded into 2-lipped oblique limb, tube usually villous within. Stamens usually 6, adnate to and round the style column with which the filaments and connectives are fused. Ovary inferior, usually more or less 6-celled; style column thick, divided above the anthers into 3-6 lobed stigmatiferous disk. Capsule thin walled, septicidally 6-valved or splitting through the placentas, the dehiscence frequently continued into the pedicels. Seeds many, horizontal, often with the remains of the placenta attached more or less flattened; albumen fleshy.

Leaves glabrous, seeds winged. 1. *A. Tagala.*
Leaves hairy beneath, seeds not winged:—
Perianth sharply bent back upon itself, lower half an inflated sac, upper trumpet or cup shaped:—
Leaves lobed, breadth equal to length or broader. 2. *A. platanifolia.*
Leaves not lobed, longer than broad:—
Leaves broadly ovate, usually densely silky beneath with spreading shaggy hairs, tube of perianth above the sac short and dilated. 3. *A. Cathcartii.*
Leaves narrow, (linear-oblong or lanceolate) undersurface of leaves not shaggy, usually thinly hairy except on the nerves; tube of perianth above the sac slender. 4. *A. saccata.*

A glabrous dextrorse twiner, roots stout, somewhat aromatic. Leaves 4-8 by 1·5-3·7 in., upper smaller, ovate or ovate-oblong, upper lanceolate, acuminate or acute, entire or slightly undulate; base cordate to subsagittate in upper leaves, usually more or less lobed around the sinus, pedately 5, sometimes 7-nerved, uppermost pair ascending; lateral nerves—excluding the basal 2-3 on either half; petiole ·6-2 in. long, often more or less coiled. Flowers dark brown in racemose puberulous, lax flowered cymes 1-3 in. long; peduncles and pedicels slender. Perianth 2·5-3·25 in. long, base inflated, tube 1-1·25 in. long, slender, curved, mouth about ·3 in. across, oblique, with recurved margins, lip 1·5-2 in. long, villous. Capsule variable in size, 1·2-5 in. long, oblong or globosely pyriform, 6-ribbed. Seeds obtusely triangular, very variable, from ·15 in. across and narrowly winged in small capsules to ·5 in. across and broadly winged in larger capsules, one face minutely tubercled or tubercles sometimes few or absent in larger seeds.

SIBSAGAR, NOWGONG, KAMRUP, N. CACHAR HILLS, LUSHAI HILLS, KHASI HILLS, up to 4,200 ft., GOALPARA; probably throughout the province.
The roots are used medicinally.

Firs. 4-6. Fr. 11-1.


A stout climber. Leaves about 12 in. long and about as broad or broader, deeply digitately 3-lobed, cleft to near the base, lobes pinnatifidly lobulate, very variable, lobules few, acute or acuminate; base rounded-cuneate or cordate, glabrous and shining above, glaucous pubescent or tomentose beneath; petioles 2-3 in. long, stout, often twining. Flowers axillary and solitary or in villous cymes on the old wood; cymes shortly peduncled; pedicels 1·1-5 in. long. Perianth yellowish with purple veins externally, clothed with spreading or villous sac 1·5 in. long, tube as long, golden
yellow within, mouth 1 in. across, obtusely 6-angled, lip recurved, purple, papillose. Capsule 4-6 by 1-1·5 in., linear-oblong, 6-ribbed with deep furrows between.

A fragmentary specimen in Forest Herbarium, Shillong, from Dambu reserve, GARO HILLS (No. 5383) has been referred to this species. KHASI HILLS, Hooker and Thompson.

The above description has been largely compiled from F.B.I.

Flrs. 10.

3. Aristolochia Cathcartii Hk. f. & T.

A large climber, with corky furrowed bark; young branchlets and petioles villous. Leaves 5·5-10 by 3·5-6·5 in., broadly ovate, sometimes ovate-lanceolate, acute or acuminate, entire; base cordate, sometimes slightly lobed along the sinus, 3-nerved or pedately 5-nerved, thinly coriaceous, pubescent or puberulous along the midrib and larger nerves specially towards the base, otherwise glabrous above, clothed, often felted with long adpressed silky hairs beneath; lateral nerves excluding the basal 5-6 on either side; petioles 1·5-4 in. long, sometimes twining. Flowers usually in short brown villous cymes from axils of existing or fallen leaves; pedicels 6-1 in. long, villous. Perianth yellowish white, with purple veins clothed with spreading hairs outside, 2·5-3 in. long along the bends, sac bent near the short neck, mouth square, densely purple papillose along the edge and the recurved lip. Capsule about 6·5 by 1·7 in., linear-oblong, bluntly apiculate, softly tomentose, 6-ribbed, grooved between the furrows; seeds about ·4 in. long, not winged, obovate, acute at the base, margins slightly incurved on the inner face, dorsally more or less truncate and margined.

KHASI HILLS, up to 3,000 ft. SIBSAGAR, DARRANG and probably in other districts e.g., GARO HILLS.

Flrs. 10-6.

4. Aristolochia saccata Wall.

A stout dextrorse climber. Bark corky, furrowed; branchlets villous with deflexed hairs. Leaves very variable, 5-8 by 1·4-2·5 in., but sometimes attaining 12 in. in length, narrow-oblong, oblong-lanceolate, acuminate; base subcordate or cordate, usually 5-nerved, pubescent or puberulous along
the midrib, otherwise glabrous above, undersurface paler and pubescent along the principal nerves, more thinly elsewhere, coriaceous; lateral nerves excluding the basal 4-5 on either side; petiole 1-2 in. long. *Flowers* about 2 in. long along the bends in villous cymes, yellowish white with purple veins, clothed with spreading hairs outside, sac curved below the neck, basal portion obscurely ridged, and marked off by a slight constriction, neck constricted about 0.3 in. long, mouth nearly circular and like the lip with a narrowly reflexed purple papillose border. *Capsule* as in *A. Cathcartii*.

**KHASI & JAINTIA HILLS,** e.g., Serarim—4-6,000 ft., 1-4,000 ft. Hooker and Thompson, SYLHET—Bruce.

There are specimens in Sibpur collected from Upper Dehing Reserve, LAKHIMPUR and Dikho Forests, ASSAM of the broad-leaved form, the leaves of which attain 12 by 7 in. (ovate-cordate).

Several species of *Aristolochia*, mostly Brazilian in original are cultivated in gardens for flowers.

Ffrs. 8-3. Fr. 5.


SYLHET. (F.B.I. V. 73).

It is extremely bitter and used by the Javanese as an emmenagogue (I.M.P.).

Ffrs. 7.

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**FAM. 112. PIPERACEÆ.**

Herbs or shrubs, usually aromatic with branches often swollen at the nodes. *Leaves* entire, alternate, rarely opposite or whorled, often gland dotted; stipules 0 or adnate to the petiole. *Flowers* minute, 1-2 sexual, in axillary catkin-like spikes or spikes umbellate, subtended by a peltate bract.
Perianth 0. Stamens 2-6 (rarely 1 or 7-8) hypogynous; anthers 2-celled, often jointed on the filaments, dehiscing longitudinally or confluent. Ovary of 3-4 carpels free or connate below, each many ovuled or ovary 1-celled with a solitary ovule; stigma sessile, simple or penicillate. Fruits indehiscent or baccate when ovary is syncarpous; of cocci or follicular when ovary is apocarpous. Seeds ovoid, oblong or globose; albumen mealy; embryo very small, enclosed in a sac of endosperm, radicle superior.

Ovary of 3-4, practically connate, carpels, 1-celled. ....... 1. Houttuynia.
Ovary syncarpous, 1-celled:--
Anther-cells distinct; stigma 3-5, more or less connate or confluent:--
Fruit baccate. ....... 2. Piper.
Anther-cells confluent; stigma usually penicillate:--
Fruit minute, indehiscent. ....... 3. Peperomia.

1. HOUTTUYNIA Thunb.

Houttuynia cordata Thunb.

A perennial with creeping root-stock; stem herbaceous, angular. Leaves 1.5-3.5 by 1.2-5 in., broadly ovate-acuminate, membranous, 5-7-nerved, approximate near the base, gland-dotted, pubescent on the nerves specially when young; base deeply cordate, sheathing, narrowed into the petiole 5.1-5 in. long; stipules linear-lanceolate. Flowers minute in dense-flowered spikes, subtended by an involucre of 4-6 white, partially connate bracts; perianth 0. Stamens 3. combined with ovary up to one-third its height; stigmas recurved. Fruit sub-globose. Seeds globose; testa membranous.

NAGA HILLS, KHASI HILLS, (upto 6,000 ft.), MANIPUR, SYLHET, PLAINS OF ASSAM.

Eaten as vegetable raw and cooked, much relished.

Flrs. 4-6. Fr. 7-8.

2. PIPER Linn.

Shrubs or perennial herbs, often climbing by adventitious roots from the nodes, usually aromatic, often glandular, nodes dilated. Leaves entire, stipulate, often unequal-sided;
basal nerves 3 or more, supra-basal nerves 1 pair, opposite or alternate. Flowers small, dioecious or polygamous, rarely 2-sexual in the axil of a peltate bract; spikes usually oppositifolius. Bracts orbicular or oblong. Perianth 0. Stamens 2-4; filaments short, anther 2-celled. Ovary 1-celled; stigma 2-6; ovule solitary. Fruit baccate, globose or ovoid, 1-seeded. Seeds usually globose; testa thin.

I. Spikes solitary. Flowers crowded; female bracts peltate:
   Fruit pedicelled:
   Climbing shrub, quite glabrous. .. 1. P. Griffithii.

II. Spikes solitary. Bracts orbicular, peltate:
   Fruit small, crowded, sessile in dense cylindric or oblong spikes:
   Fruiting spikes longer than broad:
   Leaves glabrous:
   Fruiting spikes .75-1.2 in. long:
   Leaves ovate-cordate:
   Petiole 1-3 in. long. .. 2. P. longum.
   Fruiting spike about .5-.75 in. long:
   Leaves linear-oblong or ovate-oblong, 3-5-nerved (base) .. 3. P. peepuloides.
   Fruiting spike 1-1.5 in. long:
   Fruiting spike 1.5 in. long, pendulous:
   Leaves coriaceous, oblique, ovate-oblong or ovate-cordate:
   Petiole .5-1.5 in. long. .. 5. P. Betle.
   Fruiting spike 3-6 in. long:
   Leaves membranous oblong or linear-oblong:
   Petiole not exceeding .25 in. 6. P. baehmeriae-folium.
   Leaves pubescent:
   Fruiting spikes 1.5-3 in. long:
   Leaves elliptic or orbicular-ovate:
   Climbing. .. 7. P. aurantiacum.

Fruiting spike globose; stigma sessile:
Quite glabrous:
Fruiting spikes 25-3 in. long:—
  Petiole 2-5 in. long:—
  Erect. ..
8. P. brachystachyum.

Fruiting spike 25 in. long:—
  Petiole 1-2.5 in. long:—
  Scandent.

III. Spikes solitary. Bracts peltate, orbicular. Fruits forming along interrupted spikes, pulpy, separate or sessile. Erect or scandent:—

  Quite glabrous:—
  Leaves coriaceous; apex obtuse or sub-acute:—
  Fruiting spike 4-6 in. long. ..
10. P. Hamiltonii.

Peduncles and petioles pubescent:—
  Leaves membranous, apex caudate-acuminate:—
  Fruiting spike not exceeding 1.5 in. long. ..
11. P. khasianum.

IV. Spikes solitary. Bracts adnate to rachis or with free margin. Fruit separate, usually in long solitary spikes:—

  Bracts of female short, cupular, wholly adnate, without raised margin:—
  Leaves glabrous, 5-9-nerved. ..
12. P. nigrum.

  Bracts decurrent with raised margins:—
  Leaves glabrous or puberulous beneath, 7-nerved. ..

1. Piper Griffithii Cas DC. Vern. Miti-horongdouka, Kach.; Ai-rikang, Mik.

Climbing by adventitious roots, glabrous. Leaves 1.5-3.5 by 1.2-2 in., ovate or ovate-acuminate, thinly coriaceous, glabrous, 5-nerved; supra-basal nerves opposite; base usually cordate; petiole 2.1 in. long, channelled; spikes solitary, simple. Flowers dioecious; fruiting spikes compact, dense. Fruits globose, small, constricted at the base into a stalk, black when ripe.

GOALPARA, N. C. HILLS and KHASI HILLS.

Flrs. Rainy season. Fr. Cold season.

An aromatic herb, trailing on ground also climbing on trees, glabrous, root-stock jointed. Leaves 1-4 by 8·2·5 in., orbicular-ovate or ovate-oblong, acuminate, membranous, glabrous, 5-7-nerved; supra basal nerves opposite; base cordate; petiole 2·1·2 in. long. Male spikes slender, yellow. Flowers dioecious; bracts stalked, peltate. Fruiting spike 75-1·2 by 25·3 in. long, fleshy. Ovary sunk, more or less confluent. Fruit 1 in. in diameter.

DARRANG, MIKIR HILLS, KHASI HILLS.

It contains a volatile oil, an acrid resin and piperine and it contains stimulant carminative properties. The root is described as bitter, stomachic and useful in promoting digestion. Its chief use is as a condiment (I.M.P.).

Flrs. Rainy season. Fr. Cold season.

3. Piper peepuloides Roxb.

A slender glabrous climber or an erect shrub about 10 ft. high. Leaves 2-4 by 5·1·5 in., elliptic-oblong, ovate-lanceolate, caudate-acuminate, membranous, glabrous, usually 5-nerved; supra-basal nerves usually being alternate; base obtuse and rounded; petiole 2·5 in. long; spikes solitary. Flowers dioecious, male spikes slender; bracts peltate. Fruiting spike dense, cylindric. about 1 in. long; peduncle 3·4 in. Fruit very small, 0·08 in. in diameter.

SIBSAGAR, N. E. F. TRACT, LUSHAI HILLS, DARRANG, KHASI HILLS.

The stem and roots are used as medicine in leprosy in the Khasi and Jaintia Hills (Jowai sub-division).

Flrs. Rainy season. Fr. Cold season.

4. Piper petiolatum Hook. f.

Quite glabrous. Leaves 6 by 3·5-5 in., orbicular, ovate-acuminate, thinly coriaceous, 7-nerved; base rounded. Fruiting spike cylindric, short. Fruit globose, 25 in across, yellow.

UPPER ASSAM, MISHMI HILLS (Griffith).
(F.B.I. p. 84 Vol. V. No specimen in Forest Herbarium, Shillong).

*Leaves* ovate-cordate, elliptic-acuminate, 4-7 by 2-4 in.

Cultivated for its leaf throughout the province. Propagated by cuttings.

The leaves form the well-known masticatory with the addition of lime, catechu, areca nuts and other flavouring ingredients, also used in Hindu medicine as an ingredient (Anupan). It is aromatic, carminative, stimulant and astringent.

6. **Piper boehmeriæfolium** Wall.

Tall, glabrous, scandent or creeping shrub. *Branches* ribbed, sub-terete. *Leaves* mostly inequilateral, very variable, 6-9 by 4-4·5 in. (local form), ovate, ovate-oblong, elliptic-lanceolate, acuminate, membranous, glabrous; base usually 5-(7)-nerved, oblique, occasionally auricled, rounded or narrowed into the petiole 2 in. long (sometimes up to 5 in. long). *Spikes* 4-6·5 in. long; peduncles 1-1·5 in. long. *Male* bracts stalked; anthers sessile, 2-celled. *Fruit* 12 in. in diameter.

KHASI HILLS.

Flrs. 12-2. Fr. Hot season.

**Forma. glabrifolium** C.DC. Much smaller leaves.

LUSHAI HILLS, NAGA HILLS, KAMRUP, KHASI HILLS, (upto 3,000 ft.).

7. **Piper aurantiacum** Wall.

A stout glabrous climber rooting at the node. *Leaves* 2·5-6 by 1·2-3 in., ovate, lanceolate or elliptic-ovate, caudate-acuminate, thinly coriaceous, 5-nerved, minutely gland dotted; supra-basal nerves opposite; base rounded or obtuse; petiole 5-1·3 in. long, slender; spikes elongated, sometimes up to 5 in. long. *Fruit* angular when young, globose on ripening.

LAKHIMPUR, KHASI HILLS.

Flrs. Rainy season. Fr. Cold season.
8. **Piper brachystachyum** Wall.

A much branched climber, woody branches thickened at the node and rooting. *Leaves* 2-5 by 1-2 in., elliptic-ovate or elliptic-lanceolate, bluntly caudate-acuminate, rather membranous, glabrescent, 5-nerved at the base; the pair of supra-basal nerves often very much higher up; base rounded or acute; petiole 2-5 in. long; male spike very slender, 2-3 in. long. *Fruiting spike* globose. *Fruits* small, about 1 in. in diameter.

**Khasi & Jaintia Hills** (upto 4,000 ft.).

Flrs. Rainy season. Fr. Autumn season.

9. **Piper Thomsoni** Hook. f.=P. officinatum DC.

Scandent, half woody; stem rooting at the nodes, glabrous. *Leaves* 3-5 by 1-2 in., ovate-oblong or elliptic-oblong, acuminate, membranous, 5-nerved, but often with 2 pairs supra-basal nerves; base truncate, shallow cordate or obtuse, often oblique; petiole 5-2 in. long; bracts peltate.

**Naga Hills, Lakhimpur, Manipur, N.E. F. Tract, Goalpara, Khasi Hills.**

Flrs. Hot & Rainy season. Fr. Autumn & Cold season.

10. **Piper Hamiltonii** Cas. D.C.

A climbing shrub, often creeping on the ground, quite glabrous. *Leaves* 2-3 by 1-2.5 in., elliptic, sub-acute or obtuse, coriaceous, glabrous, 5-7-nerved from above the basal nerves; base cordate, often slightly oblique; petiole 5-2 in. long. *Flowers* dioecious; male spikes slender, up to 3 in. long; bracts orbicular, peltate. *Fruiting spikes* slender, loose, interrupted, glabrous, 4-6 in. long. *Fruits* rather globose.

**Plains of Assam, Manipur, Sylhet, Khasi Hills.** (upto 5,500 ft.).

Flrs. 10. Fr. 3.

A glabrous shrub, winding clock-wise; stem glabrous. Leaves 2-4 by 0.7-1.5 in., ovate-lanceolate, oblong, caudate-acuminate, membranous, glabrous above, puberulous beneath, 5-nerved, 2-supra-basal nerves opposite; base rounded or obtuse; petiole 0.1-0.3 in. long. Flowers dioecious. Fruiting spikes loose, interrupted, about 1.5 in. long; peduncle about 0.6 in. long. Fruits globose, 0.25 in. in diameter. Seed white, arill light brown.

KHASI and JAINTIA HILLS, (upto 5,500 ft.).

Fr. 4.


A stout glabrous shrub, climbing, often trailing on the ground and rooting at the nodes. Leaves 3-6 by 1-3 in., ovate-lanceolate or broadly ovate, elliptic-acuminate, membranous, dark-green shining above, glaucous beneath, 5-nerved, 2-supra-basal nerves usually alternate; base rounded or cuneate, often oblique; petiole 0.2-0.5 in. long. Spikes very long, slender, pendulous; the female spikes often bearing bisexual flowers, but usually dioecious; bracts of female cupular, wholly adnate without raised margins; bracteoles in the female flowers forming a cup round the ovary; male spike slender, up to 6 in. long, pendulous. Fruit red, globose. Fruiting spike fleshy and interrupted.

PLAINS OF ASSAM, KHASI HILLS.
It is officinal.

Flrs. Rainy season. Fr. Cold season.

13. Piper attenuatum Ham.

A rambling, half climbing, half woody plant. Branches angled, grooved. Leaves 2-4.5 by 0.7-3 in., orbicular-ovate or elliptic-lanceolate, abruptly acuminate, membranous, sparsely puberulous beneath, 5-7-nerved, often with 1 or 2-supra-basal nerves; base cordate or truncate or acute;
petiole 1-2 in. long. Male spikes slender; bracts adnate, cupular with raised margin. Fruiting spikes about 6 in. long or sometimes more. Fruit globose, 1/16 in. across.

LAKHIMPUR, SYLHET, KHASI HILLS, GOALPARA.
Flrs. Rainy season. Fr. Cold season

A stout climber, woody, rooting at the nodes, often trailing on rocks, glabrous. Leaves 2-5-5 by 8-2-6 in., elliptic-ovate or ovate-lanceolate, acuminate, sub-coriaceous, glabrous, 5-nerved, the pair of supra-basal nerves opposite or alternate; base rounded or cuneate; petiole 3-1 in. long. Fruiting spike globose, shortly peduncled, glabrous. Fruit black, globose, partially enclosed in cupular bracteole.

KHASI and JAINTEA HILLS, (upto 6,000 ft.).
Fr. Cold season.

A low creeping herb. Leaves 3 ft. by 2-3 in., sparsely puberulous on the nerves beneath, ovate-cordate, membranous, acuminate. All over ASSAM. The fruit is used as a carminative like P. longum.

P. Mannii C. DC.
Leaves 8-3 by 3-1 in., elliptic-lanceolate, long acuminate, membranous, glabrous, 5-nerved; the 2 supra-basal nerves usually alternate; base rounded or acuminate, often oblique; petiole 05-4 in. long.

KHASI AND JAINTEA HILLS.
Many other species of Piper are also recorded from the region of the flora.

Flrs. 7.

The following and numerous other species of Piper are also recorded from Assam:—


3. PEPEROMIA Ruiz & Pav.

Peperomia reflexa A. Dietr.
A shrub, densely branched, herbaceous, procumbent on rocks near water or in shade or epiphytic; stipules 0.
Leaves in whorls of 4, 2-4 by 1-3 in., orbicular or obovate, obtuse, entire, coriaceous, pellucid-punctate; petiole 0.05-1 in. long. Flowers bisexual, minute; spikes exceeding the leaves. Perianth 0. Stamens 2, very short; anthers confluent; stigma usually penicillate. Fruit minute, indehiscent.

KHASI HILLS, N. E. F. TRACT (4,000-5,000 ft.).
Believed to be an excellent tonic and particularly efficacious in diseases of the kidney.

Flrs. and Fr. 9-11.

P. pellucida H. B. & K. A small herb of American origin is recorded from Sadiya (Royal Asiatic Society, Beng. IV, 1908, p. 632).

P. Heyneana Miq.
A small prostrate herb, quite glabrous. Leaves 3-nerved, pubescent beneath. Spikes solitary.

KHASI HILLS upto 6,000 ft., UPPER ASSAM.

FAM. 113. CHLORANTHACEÆ.

Herbs, shrubs or trees, usually aromatic. Leaves opposite, usually toothed; petioles often connate in a sheath, stipulate. Flowers 1-sexual in terminal or pseudo-axillary heads or panicles; female & male cohering in a bract. Male flowers:—perianth 0. Stamens 1-3-connate into a mass; filaments short and thick; anthers 2-celled, or if stamens 3, the lateral 1-celled. Female flowers:—perianth 0 or with a 3-toothed limb adnate to the ovary. Ovary inferior, 1-celled; style short; ovule 1, orthotropous, pendulous. Drupe small, ovoid or globose. Seeds fleshy, membranous; albumen copious, fleshy; embryo minute; radicle inferior.

CHLORANTHUS Swartz.

Perennial herbs or shrubs, the stamens articulate at the nodes. Flowers in terminal simple or panicled spike.
Male & Female flowers connate in pairs on a bract at the base. Stamens I or 3, confluent, if 3, central anther 2-celled, the laterals 1-celled. Ovary naked; stigma sub-sessile, truncate.

Leaves finely serrate:—
Stamens 3. Fruit white. . . . . 1. *C. officinalis*.

Leaves coarsely and deeply serrate:—
Stamen 1. Fruit red. . . . . 2. *C. brachystachyus*

1. **Chloranthus officinalis** Bl.

An undershrub 4-5 ft. long, glabrous; stem greenish-black, shining. Leaves 2.5-5.5 by 1-3 in., elliptic or elliptic-lanceolate, acuminate, glandular, membranous, serrulate; petiole 0.05-0.3 in. long. Flowers very small, white. Bracts sheathing. Stamens 3, connate by connectives. Fruit succulent, white.

**KHASI HILLS.**

Flrs. 6-7. Fr. 9-10.


A shrub, about 8 ft. high, woody, growing in intense shade. Leaves 1.6-5 by 0.5-3 in., elliptic or elliptic-lanceolate, acuminate, coarsely and deeply glandular-serrate, membranous; petiole about 0.2 in. long. Stamens 1. Fruit globose, red.

**KHASI HILLS.**

Flrs. and Fr. 8-3.
FAM. 114. MYRISTICACEÆ

Evergreen trees or shrubs, often aromatic and stellately tomentose. Leaves entire, exstipulate, alternate, often distichous, pellucid-punctate. Flowers small, regular, usually dioecious, fascicled, paniculate or umbellate; bracteoles persistent or caducous. Perianth gamophyllous, deciduous, inferior, usually 3 (2 or 4)-lobed, valvate in bud. Male flowers: Stamens monadelphous, 3-18 (less often 30-45); anthers usually sessile on a sessile or stipitate column or disk. Female flowers: Staminodes 0 or rare. Ovary superior, free, sessile, 1-celled; ovule 1, basal, erect, anatropous; stigma capitate, discoid or lobed. Fruit more or less fleshy, splitting into 2 rarely 4 valves. Seeds erect, enclosed in a fleshy or membranous, entire, lobed or laciniate, coloured, often aromatic aril; testa usually thick; albumen copious, hard, ruminate; embryo small, basal; cotyledons divaricate, flat or crumpled; radicle short, inferior.

Hairs peculiar. The branches or ends of the cells spreading out in 2 or several directions often giving the appearance of stellate hairs. "Med.-rays numerous, fine. The bark of most species contain long sacs filled with brown or red juice"—(Brandis).

Myristica fragrans Houtt is the Nutmeg tree of the E. Moluccas.

Warburg in his Monographie der Myristicaceae Halle, 1897 has split up Myristica Linn. into several genera. Brandis has retained the generic name Myristica adopting the generic name of Warburg as sections (Myristica, Horsfieldia, Gymnacranthera, Knema). Gamble has accepted the generic names of Warburg in his "Flora of the Presidency of Madras."

I have however followed King (Annals R. B. G. Cal. Vol. III) and Brandis and kept the old generic name Myristica but give below the nomenclature after Warburg.

Myristica contorta Warb. Syn. M. laurifolia Hk. f. & T.
Horsfieldia amygdalina (Wall) Warb.—Syn. M. amygdalina Wall.
H. Kingii (Hk. f.) Warb.—Syn. M. Kingii Hk. f.
Knema linifolia (Roxb.) Warb.—Syn. M. linifolia Roxb.
Knema angustifolia (Roxb.) Warb.—Syn. M. longifolia Wall.
including M. erratica Hk. f. & M. gibbosa Hk. f.
Knema malayana Warb.—Syn M. glaucescens Hk. f.
MYRISTICA Linn.

Flower urceolate or campanulate; anthers 12-30, linear, adnate to a column, which is often stipitate and frequently prolonged beyond the anthers, stigmas sessile. Bracteoles appressed to the perianth. Arillus lacinate to the base.—

(after Brandis)

I. Flowers urceolate or campanulate; anthers 12-30, linear, adnate to a column which is often stipitate, frequently prolonged beyond the anthers; stigma sessile; bracteole opposed to the perianth:

1. Arils lacinate to the base.

II. Flowers small, globose; anthers 12-30; stigma minute, sessile:

2. Arils not frequently lacinate; bracteoles 0; staminal column sessile:

3. Panicles more or less tomentose;

4. Arils glabrous; aril lacinate at the apex.

III. Flowers obconical or subglobose; anthers 8-20, sessile or nearly so, attached by their base stellately to a peltate usually stipitate column formed of the connate filaments:

5. Male flowers more than \( \frac{1}{16} \) in. across:

6. Young parts densely brown tomentose:

7. Fruit often solitary, 1\( \frac{1}{2} \) in. long.

8. Young parts sparsely hairy:

9. Fruit not solitary (2-3), \( \frac{3}{4} \) in. long.

10. Male flowers less than \( \frac{1}{16} \) in. across:

11. Branchlets hoary:

12. Leaves narrow-oblong:

13. Fruit ovoid or globose.

14. Branchlets glabrous:

15. Leaves linear-lanceolate:

16. Fruit oblong, gibbous at base.


A tall evergreen tree; young parts rusty-tomentose, narrow-oblong or elliptic-lanceolate, acute or subacute, coriaceous, tough, glabrous; lateral nerves 15-23 on either half,
impressed above; base acute or cuneate; petiole 0.5-1.2 in. long. Male flowers crowded (6-20) on short axillary peduncle; perianth cylindrical, supported by an ovate bract at the base. Staminal column shorter than the perianth. Female flowers sessile in axillary few-flowered cymes. Perianth pubescent outside, more or less urceolate; stigma sessile. Fruit ellipsoid or globose. 2-3 in. long; arillus deeply cut into lobes, which are again divided into lacinate segments almost enclosing the seed.

KHASI HILLS.
Flrs. 10-2. Fr. 6-7.


A tree (70'/55''); young shoots pubescent. Bark grey or brownish, somewhat rough outside with shallow vertical furrows exfoliating in square flakes, 0.25 in. thick, reddish inside with streaks of lighter tissue, 0.25 in. apart, sometimes turning deeper red and exuding blood-red juice; branches horizontal, usually crowded near the top of the tree; young shoots pubescent. Leaves 3-9 by 2-4 in., elliptic-ovate or oblanceolate, acute or bluntly acuminate, coriaceous, glabrous; lateral nerves 10-18 on either half; base cuneate or rounded; petiole 0.3-0.5 in. long. Perianth 0.12-0.13 in. in diameter. Ovary sessile, obovate or ovate; stigma small. Fruit 1.5 in. long, supported by a persistent perianth; aril entire, completely enveloping the ovoid smooth seed.

Throughout the Province (except KHASI HILLS).
Kernel of the fruits is used as a substitute for arecanut. The gum is good for mouth sores.

Flrs. Rainy season. Fr. 2-4.


A tall tree (65'/72''), glabrous. Bark brown, rough outside, slightly split vertically, 0.3 in. thick, inside light-
reddish brown, soft, fibrous with white streaks turning dark-brown, exuding reddish juice. *Leaves* aromatic (mango smell) 4-10-5 by 1-4 in., entire, elliptic to elliptic-lanceolate, acute or obtuse, thinly coriaceous (Brandis and King—membranous, but I find the Assam specimens thinly coriaceous to coriaceous according to different localities) glabrous, shining above; lateral nerves 8-15 on either half; petiole 5-9 in. long, panicles branched and spreading. *Flower* buds yellow. *Perianth* 06-9 in. across. *Ovary* sessile, apiculate, hooked, glabrous. *Fruit* obscurely trigonous, ovoid, 1-3-2 in. long, with a longitudinal ridge on back and a shallow channel on the opposite side; aril thin, fleshy, yellowish, laciniate from the apex. *Seeds* 8 in. long, oblong-cylindric.

SIBSAGAR, CACHAR, N.C. HILLS, LUSHAI HILLS, GOALPARA, GARO HILLS and on the foot of KHASI HILLS.

Seeds are edible and the aril is eaten by Mikirs.

Flrs. Cold season. Fr. 1-5.

4. **Myristica linifolia** Roxb.—Myristica longifolia Wall. Vern. Tagling-asing, Abor; Se, Manipur; Tring-thi, Lushai; Garo-bhala, Ass.; Dieng-soh-langor-shri, Dieng-sohslung, Dieng-tyrkhou, Kh.; Chekulo-arong, Mik.; Duingkim-chi-ching, Naga; Bolanchi, Garo.

A lofty tree (60'/62''); young parts densely tomentose. *Bark* rough, greyish-brown with horizontal wrinkles and light vertical fissures, 3 in. thick, reddish-brown inside, fibrous, exuding profusely a blood-red juice. *Leaves* 12-20 by 2-5 in. or more, elliptic-oblong, narrow-oblong or ovate-oblong, acute or obtuse, entire, coriaceous, glabrous (covered above with a loose, brown, stellate tomentum which rubs off easily) glaucous beneath; lateral nerves 18-35 on either half, conspicuous, almost parallel, anastomising under the margins; base rounded or shallow cordate; petiole 3-1-2 in. long. *Male* flowers salmon pink, about 3 in. across, fascicled on a tubercle. *Stamens* 12-18; bracteoles small on the pedicel near the middle or below, oblong-ovoid. *Fruit* 1-5-2 in. long, solitary, ellipsoid, velvety; aril covering the whole seed, thin, pale-yellow, lobed.
N.-E. F. TRACT, SIBSAGAR. KAMRUP, CACHAR, SYLHET, N. C. HILLS, LUSHAI HILLS, GARO HILLS, K. & J. HILLS.

Wood cream coloured, used for house building (away from contact with the ground or rains) Juice caustic. Sap and smoke often produce sores.


A lofty tree (65''/45''); young parts slightly hairy. Bark greyish-brown with white patches, exfoliating in large flakes, thin; reddish inside, exuding copious blood-red juice. Branches crowded at the top at right angles with stem. Leaves 4-16 by 1·2-3·5 in., bifarious, elliptic to oblong-lanceolate, obovate-elliptic or ovate-oblong, entire, acute or acuminate, thinly coriaceous, glabrous, pale beneath (covered with a caducous, stellate tomentum); lateral nerves 19-30 on either half, conspicuous; base cuneate or rounded; petiole 3-7 in. long. Perianth of male flowers, 2-25 in.; pedicel usually longer than the flower; bracteoles inserted above the middle of the pedicel. Fruit 75-1·2 in. long, 2-3 on axillary woody tubercles; aril membranous.

SIBSAGAR, LAKHIMPUR. GOALPARA. CACHAR, SYLHET, N. C. HILLS, GARO HILLS, K. & J. HILLS.

Juice is applied to sores in the mouth. Gum is used as a medicine for dysentery in Garo Hills.

Frs. 11-12. Fr. 1-4.

6. Myristica glaucescens Hk. f.

A tree. Young parts rufous pubescent. Leaves 3-8 by 1-2 in., oblong-lanceolate or elliptic-lanceolate, acute or acuminate, chartaceous, glabrous above, glabrescent beneath; lateral nerves 12-24 on either half, almost parallel, prominent beneath; base obtuse or sub-acuminate; petiole 3-6 in. long. Male flowers 1-16 in. across, in sub-sessile, pubescent, umbellate, 5-8 flowered clusters axillary or from tubercles. Perianth lobes 3; anthers 10-12, inserted radically
on a flattened disc. *Female* flowers in fewer flowered umbels. *Ovary* sessile, globose; stigma peltate, 4-lobed. *Fruit* ovoid or obovoid, about 1 in. long, rusty-tomentose; aril thin.

**SIBSAGAR.**

Flrs. 12-1. Fr. 2-4.

7. *Myristica gibbosa* Hk. f. & T.

A tree; branchlets slender, horizontal, glabrous; crown small, spherical. *Leaves* 3-9 by 1-2·5 in., narrow-lanceolate, oblong-lanceolate or elliptic-lanceolate, acute or acuminate, thinly coriaceous, glabrous above, glaucescent beneath; lateral nerves 16-24 on either half, brownish; base acute or obtuse; petiole 3-7 in. long. *Male* flowers in fascicles. *Perianth* deeply divided into 3 triangular teeth, rufous tomentose outside, glabrous inside; anthers 10-12, on an almost concave disc. *Fruit* 1-1·5 in. long, gibbous at the base, ovoid, rufous-tomentose; aril almost entire, thin.

**CACHAR, LAKHIMPUR, NAGA HILLS, K. & J. HILLS, (3,000 ft.).**

Flrs. 12-2. Fr. 3-5.

"Probably a variety (of *M. angustifolia* Roxb. with the fruit gibbous at the base")—Brandis.

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**FAM. 115. LAURACEÆ**

Erect, aromatic trees or shrubs, rarely leafless twinning parasites, mostly evergreen. *Leaves* alternate, extipulate, rarely opposite or sub-opposite, often crowded at the ends of branches, gland-dotted, glands often visible as minute pellucid dots, usually entire, lobed. *Flowers* regular, small, hermaphrodite or dioecious, in axillary or lateral cymes, clusters, racemes or panicles; bracts 0 or deciduous, often
involucre-like; perianth usually inferior, often connate in a short tube below; lobes usually in two whorls of 3 each, rarely more or less imbricate or subvalvate, equal or unequal, deciduous or persistent in fruit, sometimes enlarged. *Stamens* usually in 2-4 series on the perianth tube of 3 each, one of which is reduced to staminodes, perigynous or hypogynous; filaments usually flattened, those of the inner series often with 2 large glands each at the base; anthers continuous with filaments, 2- or 4-celled, rarely 1-celled, opening by as many valves which are deciduous from the base upwards; in female flowers the stamens are reduced to usually linear or clavate staminodes, the inner bi-glandular as in males. *Ovary* 1-celled; style terminal; stigma often 3-lobed, discoid or dilated; ovule 1, anatropous, pendulous from the apex of the cell. *Fruit* a dry or fleshy berry or drupe, often surrounded at the base by the enlarged receptacle or by the base of the perianth tube, and supported by the thickened pedicel, rarely enclosed in or adnate to the perianth tube. *Seeds* exalbuminous; testa membranous; cotyledons plano-convex; embryo straight, radicle minute, superior.

Trees or shrubs:—

Stamens of 3rd row (if present), extrorse:—

Flowers usually hermaphrodite, rarely polygamous:—

Anthers 2-celled:—

Stamens of 3 rows perfect:—

Perianth accrescent and persistent, enclosing the fruit. . . . . 1. Cryptocarya.

Perianth deciduous:—

Perianth lobes unequal:—

Pedicel thickened, coloured in fruit. . . . . 2. Dehaasia.

Perianth lobes equal:—

Pedicel not thickened in fruit. 3. Beilschmiedia.

Stamens of rows 1 & 2 absent:—

Perianth segments 6:—

Perfect stamens 3. . . . . 4. Endiandra.

Anthers 4-celled, fertile. Stamens usually 9:—

Leaves usually opposite and terminal:—

Perianth in fruit with persistent usually enlarged tube and usually deciduous segments. . . . . 5. Cinnamomum.
Leaves alternate:—
Perianth segments deciduous.  
Fruit on enlarged fleshy pedicels. .. 6. Alseodaphne.
Perianth segments persistent; pedicels hardy, enlarged:—
Perianth segments reflexed. .. 7. Machilus.
Perianth segments erect, clasping the base of the fruit. .. 8. Phœbe.

Stamens all introse:—
Flowers usually dioecious:—
Anthers 4-celled; fertile stamens 9 or more:—
Bracts imbricate, deciduous:—
Leaves sub-whorled. .. 9. Actinodaphne.
Bracts whorled, (involucrate), persistent:—
Leaves alternate in sub-opposite, penni-nerved, fertile stamens 9 or 12. 10. Litsæa.
Bracts (involucrate) early deciduous:—
Leaves alternate or sub-verticillate tripli-nerved, fertile stamens 6. .. 11. Neolitsea.

Flowers bisexual:—
Anthers 4-celled, perfect stamens 10-15:—
Fruit on the flat perianth tube. .. 12. Dodecadenia.
Anthers usually 2-celled. Stamens 9-12:—
Fruit on the unaltered perianth tube. 13. Lindera.

Flowers small, hermaphrodite:—
Anthers 2-celled; stamens (perfect) 6, adnate to the perianth tube, perianth 6-partite. .. 14. Purkayasthæa.

Twining filiform parasite:—
Leafless; stamens with 4-celled anthers, outer 2-rows introse, inner rows extrorse. .. 15. Cassytha.

*Persea gratissima Gærtn.* is the *Avocado Pear* of the West Indies sometimes found in cultivation for the pleasant edible fruit.

1. CRYPTOCAarya R. Br.

Evergreen trees or shrubs. *Leaves* usually alternate, penni-nerved or 3-ribbed, more or less coriaceous. *Flowers* small, hermaphrodite, in axillary or subterminal pedunculate panicles. *Perianth* tube turbinate or ovoid, after flowering constricted at the top; lobes 6, sub-equal. *Perfect* stamens 9 in three series, those of the first and second series eglandular, introse, of the third series extrorse, each with 2 glands; anthers 2-celled, interior to the stamens there is
a fourth series of stipitate cordate staminodes. Ovary sessile at the bottom of the perianth tube in which it is enclosed; style shortly exserted; stigma obtuse or capitate. Fruit oblong or globose, smooth or ribbed, wholly included, in accrescent hardened or fleshy perianth tube; pericarp membranous or thinly crustaceous more or less free from the perianth tube. Seeds with a membranous testa, not often separable from the pericarp; cotyledons thick, fleshy; radicle minute.

The glands are described by some authors Bentham (Fl. austral V. 294) and Koorders and Valcton (Bijdr. X, 211). Gamble (Flora of Madras) as free and alternate with the stamens of the first and second series. They are slightly in front of the stamens of the first and second series and slightly behind those of the third series.

Outer coat of fruit smooth, not ribbed:—
Leaves medium sized, 1-3·2 in. broad; fruit
-7-1 in. long. . . . . . . . . . . . . . . . . . . . . . . . 1. C. amygdalina.
Leaves large, 3·5-8 in. broad; fruit 1·5-2·5
in. long. . . . . . . . . . . . . . . . . . . . . . . . 2. C. Andersoni.


Usually a medium sized tree, with spreading crown but sometimes (100′/55″). Bark dark brown with fine reticulating vertical fissures; blaze aromatic, reddish brown with streaks, turning deeper brown on exposure; branchlets puberulous or pubescent. Leaves 4·5-8 by 1·2-3·5 in., oblong-lanceolate to elliptic or oblanceolate, shortly acuminate, acute or obtuse, thinly coriaceous, shining above, green on both surfaces, glabrous or nearly so; base acute or obtuse; lateral nerves 6-7 on either half, distant; petiole upto 7 in. long. Panicles terminal and from upper axils, pubescent, long peduncled, often large and much branched; pedicels pubescent, very short, joined; bracts caducous, linear; lower larger, lanceolate, silky-villous, 1·2 in. long. Flowers about 15 in. across, and as long, tomentose outside; perianth tube about as long as the lobes; segments oblong or elliptic. acute
or obtuse. *Fruit* 7-1 by 4-5 in., strongly ribbed when very young, finally smooth, pointed at either end, turgid, aromatic.

Throughout the Province. The timber is used for tea boxes but has been to a great extent replaced by three-ply wood.

Frs. 3. Fr. 11.

**C. floribunda** Nees. has been united with the above in F.B.I. It occurs in Sibsagar, and other district of Upper Assam. Kanjilal’s sheet No. 2104, Purkayastha, (Forest Research Institute sheets Nos. 60272 & 61807) from Jorhat, and also in Khasi and Garo Hills. It differs from *C. amygdalina* Nees in the following characters:—

Leaves papillose beneath, rather thick, undersurface glaucous; lateral nerves 6-10 pairs. *Young* fruits much broader below than above.

In Calcutta herbarium *C. floribunda* is shown as a distinct species.


A large tree. *Bark* rough, dark brown or grey with more or less vertical fissures exfoliating in oblong flakes, 5-75 in., thick; blaze light brown or reddish brown, slightly aromatic; young shoots ferruginous-tomentose. *Leaves* 7-15 by 3-5-8 in., elliptic to elliptic-obovate, shortly and usually abruptly acuminate, coriaceous, glabrous and shining above, undersurface reddish brown, pubescent along the nerves when young, glabrate with age; base acute; lateral nerves prominent, 10-12 on either side, nearly straight; tertiaries sub-parallel; petiole stout; 1.3-3 in. long. *Panicles* large, upto 12 in. long, long peduncled, pubescent; pedicels very short, grey or fuscous-tomentose; bracts caducous, linear-lanceolate, tomentose, about 1.5 in. across and about 1.2 in. long. *Flowers* very small, grey or dun tomentose outside. *Perianth* segment ovate to elliptic, obtuse or sub-acute. *Stamens* hairy. *Fruit* 1.5-2.5 by about 7.1.3 in., smooth, ellipsoid or oblong; bright, blue-black when ripe; fruiting pedicels red, much thickened.
Beilschmiedia.] 115. LAURACEÆ. 51

LAKHIMPUR, KHASI HILLS, upto 2,700 ft. CARO HILLS, common, N. CACHAR HILLS, DARRANG.
The wood is cream coloured and tough, not used.
Flrs. 6. Fr. 1-3.

3. BEILSCHMIEDIA Nees.

Evergreen trees or shrubs. Leaves alternate or opposite, penninerved. Flowers usually small, 2-sexual, panicked or sometimes solitary. Perianth tube short, lobes 6, subequal. Perfect stamens 9, in the first and second series eglandular with introrse anthers; in the 3rd series 2 glandular with extrorse anthers; in the fourth series staminodes ovate or cordate. Ovary free, attenuate in the style; stigma obtuse. Fruit ovoid, oblong or globose; perianth quite deciduous in fruit leaving a narrow ring; cotyledons fleshy, often with a rudimentary dissepiment between them.

Leaves mostly alternate, terminal buds small, pubescent or tomentose, not enclosed in coriaceous scales:

Inflorescence pubescent:
Panicles or racemes short, usually less than 1·5 in. long. Perianth segments linear-oblong. Fruit usually 8-1·5 in. long. . . 1. B. Roxburghiana.
Panicles or racemes upto 2 in. long. Perianth segments broad-ovate, rounded or obtuse. Fruit 2·2-5 in. long. . . . 2. B. Brandisii.

Leaves mostly opposite, terminal buds enclosed in large coriaceous concave scales:
All parts glabrous:
Fruit oblong or elliptic-oblong, not apiculate; terminal buds lanceolate. . . . 3. B. assamica.
Fruit globose-ovoid, apiculate; terminal buds ovoid. . . . . 4. B. Gammieana.


A medium sized evergreen umbrageous tree. Bark nearly white to grey or greyish brown, rather rough, 25-6 in. thick; blaze reddish brown, turning deeper brown on exposure; young parts brown silky-tomentose. Leaves alternate or sub-opposite, crowded at the ends of branches, 3-7
by 1·3·2 in., oblong to elliptic-lanceolate or elliptic-oblong, bluntly short-acuminate or obtuse, glabrous, coriaceous, narrowed at the base into the petiole; lateral nerves 6-12 on either half with prominently reticulating raised nervules between; petiole channelled, 5-1·2 in. long. Flowers small, 2 in. long and about 25 in. across, yellowish green, in short, silky, few flowered, peduncled panicles or racemes, which are axillary or from axils of fallen leaves or lateral from the axils of caducous scales and 5-1·5 in. long; bracts deciduous, small, broad, silky. Perianth deeply divided; lobes oblong-acute, pubescent on both surfaces. Filaments hairy, glands of 3rd row of stamens about as large as the ovoid staminodes. Ovary glabrous. Fruit baccate, obovoid-oblong, 8-1·5 in. long, dark purple when ripe.

Throughout the Province.
The leaves are sometimes upto 10 in. long.

Flrs. 3-5 with new leaves. Fr. rainy season.

B. fagifolia Nees, is scarcely more than a form of the above. The bark is usually more smooth, leaves are sometimes puberulous and the flowers are enclosed by caducous, broad, usually ovate silky bracts 15-25 in. long.

This character is not in correlation with constant reduction in the size of the leaf as mentioned (Hooker in Flora of British India).

SIBSAGAR, KAMRUP, GOALPARA, probably all over the province.


A moderate to medium-sized tree with slightly rough, light grey nearly white bark about 3·5 in. thick, pale or reddish brown inside, turning darker on exposure; buds silky-tomentose. Leaves alternate to sub-opposite, 3·5-8 by 1·3·3 in., elliptic-oblong to elliptic or lanceolate, bluntly short-acuminate, thinly coriaceous, glabrous, narrowed and usually acute or cuneate at the base; main lateral nerves slender, 8-10 on either side, curved near the margins: tertiaries prominent beneath; petiole 5 in. long, channelled. Panicles axillary or lateral upto 2·25 in. long, pubescent. Flowers about 2 in. across. Perianth segments broadly
Beilschmiedia. 115. LAURACEÆ. 53

ovate, rounded or obtuse, pubescent outside. Ovary glabrous. Anthers glabrous. Fruit baccate, 2-2.5 in. long by 0.8-1 in. across, oblong, glabrous, blue-black when ripe; fruiting peduncles stout.

LAKHIMPUR, DARRANG, SIBSAGAR, KAMRUP, KHASI & JAIN'TIA HILLS below 2,000 ft., GARO HILLS, GOALPARA, probably throughout the province.

Frs. 12-2. Fr. 3-5.


A very large tree. Bark light grey, almost white to brownish grey or brown, nearly smooth with horizontal wrinkles or slightly rough in old trees, 1.3-5 in. thick; blaze soft, reddish brown or brown, turning deep brown on exposure; all parts glabrous; terminal buds lanceolate upto 1 in. long, enclosed in linear-oblong or lanceolate, glabrous, coriaceous scales. Leaves opposite or sub-opposite, approximate on the shoots, 3-8 by 1.3-3.5 in., elliptic-oblong, lanceolate or elliptic, shortly blunt-acuminate, firmly coriaceous, often pellucid-punctate; main lateral nerves 8-12 on either side, prominent on both surfaces; base cuneate, petiole 1.4-7 in. long. Panicles usually shorter than the leaves, rarely longer, glabrous. Flowers not seen. Fruit 1-1.7 by 0.6-8 in., elliptic or ovoid-oblong; base shortly contracted, black when ripe.

Throughout the area ascending to 3,000 ft. in the KHASI HILLS. An excellent firewood. The timber is used sometime for boats but does not last.

The larger leaved form is probably a different variety but I am unable to separate it with the materials I have examined.

Frs. buds. 12. Fr. 2-3.


A medium sized tree with spreading branches. Bark light or greenish-grey to yellowish brown, nearly smooth,
about ·3 in. thick; blaze brown, all parts glabrous; terminal buds ovoid, upto ·3 in., enclosed in coriaceous scales. Leaves opposite or sub-opposite, 4-6 in., oblong-lanceolate, elliptic-oblong or ovate, obtusely acuminate, firmly coriaceous; base cuneate or attenuate to the petiole, lateral nerves slender, 10-15 on either side; petiole ·25-·5 in. long. Panicles or racemes very short, upto 1 in. long. Flowers not seen. Fruit ·75-1·2 by ·75 in., globose-obovoid, shortly apiculate; base shortly contracted.

KHASI HILLS, 5-6,500 ft., LAKHIMPUR, Jeypore (Sheet No. 3390 but the specimen is rather incomplete).

Flrs. 3-5. Fr. 11.

4. ENDIANDRA Brown.

Endiandra firma Nees.

An evergreen tree; terminal buds thinly silky. Leaves alternate, 4·5-7 by 1·3-1·8 in., elliptic-oblong, acuminate, glabrous, concolorous, green; main lateral nerves upto 11 on either half, obliquely arcuate; petiole stout, about ·5 in. long. Flowers about ·25 in. across, bisexual, pedicellate in short axillary panicles 1-2 in. long; branches spreading, puberulous; bracteoles minute. Perianth tube very short, tomentose at the base within; segments 6, in two series, broadly ovate-obtuse, usually ciliolate, glabrous outside; outer 3 broader, tomentose within near the base; inner three tomentose within. Anthers 3, sessile, thick, narrowly sub-sagittate, tomentose, extrorsely 2-locular, valves oblong. Fruit not seen, (according to Hooker 1·25 in. long) elliptic-ovoid with rounded tip.

CACHAR—Keenan. SYLHET, (De Silva).

Flrs. 10-11.

5. CINNAMOMUM Blume.

Evergreen trees or shrubs. Leaves alternate or opposite, usually with three strong basal nerves. Flowers small, 2-sexual or polygamous with larger females in axillary and sub-terminal panicles. Perianth tube short; segments sub-equal. Perfect stamens 9 or fewer; filaments of first and
second series eglandular with introrse 4-celled anthers of the 3rd, 2-glandular with extrorse 4- (rarely 2) celled anthers; staminodes of the fourth series cordate or sagittate. Fruit seated on the enlarged perianth, the segments of which are wholly or partly deciduous or very rarely persistent and entire.

Leaf buds with small scales:—
Leaves usually opposite:—
Leaves triple-nerved at base, glabrous:—
Buds and young shoots more or less silky:—
Leaves 2·5-6 in. long, coriaceous:—
Panicles about as long as the leaves.
Leaves 6-12 in. long, thickly coriaceous:—
Panicles usually exceeding the leaves...
Buds and young shoots glabrous:—
Leaves ovate, 2·4-5 in. long:—
Panicles few flowered...

Leaves alternate:—
Leaves orbicular or elliptic, 2·5-4·5 in., caudate-acuminate, 3-5-nerved:—
Flowers in few flowered short cymes...
Leaves lanceolate, 3-6 in. long, 3-nerved:—
Flowers in long panicles...

Leaf buds enlarged in large, silky, orbicular concave, imbricate, deciduous scales:—
Leaves alternate, penninerved:—
Panicles crowded, densely tomentose:—
Fruit ellipsoid or oblong, 6-1·25 in. long...
Panicles few flowered, nearly glabrous:—
Fruit obovoid, about 1 in. long...
Panicles glabrous:—
Leaves 2·5-4 in. long:—
Fruit sub-globose, 5 in. long; seated on the thickened pedicel and cup-shaped base of the perianth...
Panicles glabrous or nearly so:—
Leaves 2·5-7 in. long:—
Fruit globose, 5-7 in. long; seated on the expanded perianth cup...

C. zeylanicum Blume is the Cinnamon of S. India; sometimes cultivated.

A medium-sized branchy tree. Bark rather rough, dark grey, almost black or dark brown; blaze aromatic, reddish brown, darkening on exposure. Leaves alternate, sub-opposite or opposite on the same twig, 2·5-6 by 1-2·5 in., ovate-oblong or elliptic to oblong-lanceolate, acuminate with the tip, often subfalcate or acute, glabrous, pink when young; base sub-triplinerved; tertiary nerves fine, sub-parallel; petiole 3-5 in. long. Panicle about as long as the leaves or slightly exceeding them; branches and pedicels grey pubescent; pedicels 15-2 in. long. Flowers about 3 in. across. Perianth silky; segments subequal, upto 2 in. long, oblong or elliptic-oblong, silky-pubescent on both surfaces, longitudinally ribbed, breaking off below the middle in fruit. Stamens villous. Ovary free, villous; style glabrous, filiform. Drupe black when ripe, 5 in long, ovoid, supported by the thickened peduncle and the enlarged truncate toothed base of the perianth.

Throughout the Province ascending to 6,000 ft. in the KHASI HILLS.

The leaves are *Tejpat* of commerce. The bark is used as a substitute for *cinnamon*.

Firs. 2-5. Fr. 6-10. New leaves 3-5.


A large tree. Bark grey or brownish white, rough, upto 75 in. thick; blaze aromatic, yellowish or pale brown, turning darker brown on exposure. Leaves 6-12 by 1·5-3·5 in., elliptic-oblong or elliptic, obtuse, acute or acuminate, glabrous, sometimes glaucous beneath, very coriaceous; base 3-nerved; nervules rather prominently reticulate beneath;
petiole stout, \( \cdot 5 \cdot 7 \) in. long. **Panicles** large, long peduncled, subterminal, usually exceeding the leaves, minutely pubescent or puberulous, glabrate with age; branches more persistently pubescent; pedicles short, **upto** \( \cdot 5 \) in. long, usually hoary with silky pubescence. **Perianth** about \( \cdot 25 \) in. across; lobes silky on both surfaces; of the inner 3 usually villous, all persistent in fruit, elliptic or ovate. **Stamens** and ovary sharply pubescent. **Fruit** \( \cdot 3 \cdot 5 \) in. long, ellipsoid or sub-globose, seated on the slightly enlarged perianth.

Throughout the Province.

In some forms the leaves attain \( 15 \) by \( 5 \) in.; the basal nerves arising about \( 1 \) in. from the base.

**Flrs.** 1-3. **Fr.** Rainy season.


A large shrub or a small tree; branches more or less quadrangular, glabrous. **Bark** grey with streaks of brown on stem, green on branches; young shoots and leaf buds glabrous. **Leaves** \( 2 \cdot 4 \cdot 5 \) by \( \cdot 7 \cdot 1 \cdot 75 \) in., elliptic-ovate, ovate-lanceolate to oblong-lanceolate, acuminate, sometimes caudate-acuminate, firmly coriaceous, usually glaucous and finely reticulated beneath; base acute, rounded or sub-cordate, usually 3-nerved, rarely 5-nerved; petioles \( \cdot 2 \cdot 4 \) in. long. **Peduncle** with 3 flowers; pedicels \( \cdot 25 \) in. long, minutely pubescent or puberulous. **Perianth** \( \cdot 15 \) in. across; segments patent, laciniate, deciduous in fruit nearly to the base, elliptic or ovate, pubescent on both surfaces; inner surface usually more densely adpressed silky. **Filaments** hairy. **Fruit** globose, about \( \cdot 3 \) in. across(?) often insect attacked, seated on the truncate toothed accrescent base of the perianth.

KHASI HILLS \( 4 \cdot 6.000 \) ft., CACHAR HILLS, Sonai Reserve.

**Flrs.** 5. **Fr.** 9.


A moderate sized tree (according to F. B. I. a large glabrous shrub) with zig-zag branchlets. **Bark** dark brown
or grey, exfoliating in thin roundish flakes; blaze reddish, turning reddish brown, aromatic. *Leaves* alternate, 2·5-4·5 by 1·2-3·3 in., elliptic or orbicular, obtusely caudate-acuminate, 3·5 nervèd; base acute or cuneate, sometimes oblique; tertiaries fine, sub-parallel; petiole slender, 3·3-4 in. long. *Flowers* minute, 1·1-12 in. across, in short few flowered pubescent cymes, simple or arranged in panicles, axillary and terminal; pedicels slender, upto 25 in. long. *Perianth* segments silky on both surfaces, accrescent in fruit, acute. *Filaments* very short, hairy. *Fruit* 6-75 in. long, bright-scarlet, ellipsoid, globose, rarely obovoid, fleshy, seated on the fleshy 6-lobed perianth cup, 3·5 in. across.

**CACHAR, CARO HILLS, KHASI & JAINTIA HILLS**—upto 3,000 ft.

Flrs. 6-9. Fr. 3. ? (apparently following year).


A middle sized tree; branches terete, slender, glabrous. *Leaves* alternate, 2·8-6 by 1·2 in., sub-coriaceous, elliptic-oblong or lanceolate, acuminate, glabrous, somewhat shining above, pale (dry) ashy below; nerves 3; petiole 2·3 in. long. *Panicles* sub-terminal, minutely pubescent, branches angular; pedicles slender. *Perianth* tubular, short, glabrous inside; lobes ovate, 12 in. long and 1 in. broad outside, somewhat smaller inside, puberulous on both sides. *Stamens* spathulate. *Ovary* ovoid, glabrous; style 0·05 in. long, somewhat thickened; stigma peltate, oblique. *Drupe* ellipsoid, 5 in. long, 3 in. across; fruiting calyx cup-shaped; fruiting pedicel obconic.

**CACHAR**—J. S. Owden.
(Repertorium specierum novarum XXI 1-10, 30th September, 1932).

khong-kharai, Kach.; Mantun-thing, Thing-par-sen, Kuki; Than-sang, Naga; Gonoroï, Manip. & Sylh.; Gam-salu, Garo.

A large to middle-sized tree, with dark brown or grey furrowed bark; blaze usually brown with darker streaks. Bud scales broadly ovate or sub-orbicular, imbricate, brown, silky tomentose; inflorescence and juvenile shoots brown tomentose; older branchlets glabrous, green. Leaves similar to C. glanduliferum, often green beneath. Panicles usually crowded at the base of the current year's shoots. Flowers densely tomentose; pedicels slightly stouter than in C. glanduliferum. Fruit 6-1.25 in. long, ellipsoid or oblong (F.B.I.) seated on the much enlarged perianth-cup.

Throughout the Province.
The timber is durable and used for furniture and boat-building.
Flrs. 2-3. Fr. 10-11.


A large tree. Bark 5-6 in. thick, dark-brown or grey, sometimes almost black, furrowed, also often with lines of large warts; inside reddish brown with streaks of lighter coloured tissue, fibrous; buds enclosed in large orbicular concave silky tomentose imbricating scales. Leaves alternate, very variable in size and shape, usually 2.5-5 by 1.2-2.7 in., elliptic, orbicular or lanceolate, somewhat bluntly acuminate, sometimes caudate, thickly coriaceous, often glaucous beneath; base acute or cuneate, penninerved; lateral nerves 4-6 on either side, often with punctate glands at the axils; petiole 3-1 in. long. Panicles axillary terminal and upto about 3 in. long, few-flowered, nearly glabrous; peduncles slender, upto 15 in. long. Flowers 15-2 in. across.; pedicels short. Perianth segments thinly pubescent outside, villous within, deciduous nearly to the base. Stamens hairy. Ovary glabrous. Fruit upto about 1 in. long, obovoid, seated on the fleshy perianth tube.

N. E. FRONTIER, LAKHIMPUR, SIBSAGAR, KAMRUP and upto 5,000 ft. in KHASI & JAINTIA HILLS.
Leaves turn red before falling. The timber is durable but does not polish well. It makes strong furniture. (Insect proof).

Flrs. 6. Fr. 8.

8. **Cinnamomum Camphora** *F. Nees.*

A small low branched tree with spreading crown. **Bark** dark grey, almost black, furrowed; twigs glabrous. **Leaves** with a pleasant camphoraceous odour, 2·5-4 by 1·2-2 in., elliptic-lanceolate, ovate or sub-orbicular, acuminate, dark green and shining above, with a greyish or glaucous bloom on the undersurface, more or less narrowed to the petiole; base 3-nerved, nerves often with punctate glands at the axils; petiole ·5-1·5 in. long, slender. **Flowers** fragrant, pale yellowish, upto ·2 in. across in glabrous panicles towards the ends of the branches. **Glands** of the stamens yellowish. **Berry** sub-globose, black, seated on the thickened pedicel and cup-shaped base of the perianth.

Cultivated in gardens at Shillong and in many other districts but nowhere extensively.

**Axis of sub-basal nerves tumid.**

The **Camphor** tree of China, Japan and Formosa. The **Camphor** is distilled from chips of old wood but in cultivation in Ceylon, the **Camphor** is distilled from young shoots.

Flrs. 3-5. Fr. Rainy season.

9. **Cinnamomum Parthenoxylon** *Meissn.*

A large tree. **Leaves** very variable in size and shape, 2·5-7 by 1·5-3 in., ovate, lanceolate to broadly elliptic, acuminate to sub-acute or obtuse, often glaucous beneath; lateral nerves 4-6 on either side; axils often glandular punctate; petiole slender, ·7-1·2 in.; bud-scales silky. **Panicles** 1-3 in. long, nearly glabrous. **Perianth** ·1 in. across; segments glabrate outside, pubescent within, wholly deciduous. **Stamens** hairy. **Ovary** glabrous. **Fruit** globose, succulent, ·5-·7 in. long, seated. on the expanded perianth cup, which is ·3-·5 in. across.

**A native of BURMA, MALAYAN PENINSULA and the EASTERN ARCHIPELAGO.** Some incomplete sheets have been provisionally
referred to this species (4423, 7792) but further material is needed for satisfactory determination. There are no specimens in Royal Botanic Garden, Calcutta.

Frs. and Fr. 3-5.

6. ALSEODAPHNE Nees.

Evergreen trees. Leaves alternate, often crowded at the ends of branchlets, penninerved. Flowers hermaphrodite, in panicles. Perianth-tube short; segments 6, sub-equal or the 3 outer rather smaller. Stamens 9, perfect; filaments of I and II series eglandular; anthers 4-celled, introrse; of III series bi-glandular; anthers extrorse, glands at the inner base of the filaments usually free; staminodes (4th series) large, stipitate, ovate or cordate. Ovary ovoid; style slender; stigma peltate. Fruit ellipsoid or globose, seated on the club-shaped end of the thick fleshy pedicel; cotyledons fleshy.

Leaves quite glabrous:—
Leaves 7-12 in. long, elliptic or oblong, rigidly coriaceous:—
   Fruit 1-5 in. long. ... ... 1. A. petiolaris.
Leaves 3-5 in. long, lanceolate, thinly coriaceous:—
   Fruit 1-4 in. long. ... ... 2. A. Owdenii.
Leaves glaucous and minutely rusty puberulous beneath:—
Leaves 5-10 in. long, sub-coriaceous. ... 3. A. Keenani.


A large tree (70°/60"—150°/12" Khalasi block, Goalpara). Bark greyish brown or dark grey with vertical fissures, 5-1 in. apart, 7-1 in. thick; inside soft, somewhat mucilaginous, pinkish or light-reddish brown with distant broad whitish streaks. Leaves 7-12 by 3-5 in., elliptic or oblong or ovate-oblong, bluntly acuminate, rigidly coriaceous, glabrous; lateral nerves 8-12 on either half, prominent beneath; tertiary nerves parallel; base narrowed into the petiole, petiole thick, 1-2 in. long. Panicles terminal, 3-7 in. long, minutely rusty pubescent (purplish?). Flowers about 1 in. across, minutely pubescent. Perianth tube funnel-shaped.
Stamens glabrous. Fruit oblong-ellipsoid, 1.5 in. long, black when ripe, fruiting pedicel much thickened.

LAKHIMPUR, SIBSAGAR, GOALPARA, GARO HILLS, CACHAR, N. C. HILLS, K. & J. HILLS.
Wood reddish-brown, coarse grained.

Frs. 10-1. Fr. 6-7.


A large tree (60'/5'); branches pale, glabrous. Leaves 3-5 by 1-1.5 in., lanceolate, acute or bluntly acuminate, entire, thinly coriaceous, glabrous, paler glaucous beneath; lateral nerves 4-7 on either half, arcuate, somewhat prominent; base attenuate, petiole 2-4 in. long. Panicles lax from beneath the crowded leaves. Perianth segments 0.08 in. long, minutely puberulous, ovate, caducous in fruit. Filaments puberulous; of 3rd series with 2 glands close to the base; staminodes (4th series) cordate. Drupe 1-1.4 in. long, ellipsoid, green; fruiting pedicel thickened, about 4 in. long. Fruits blue-black when ripe.

Timber of good quality, much valued in Surma Valley.

Frs. 5. Fr. Rainy season (8-9).

3. Alseodaphne Keenani Gamble.

A large tree; branches thick, greenish, somewhat inconspicuous, lenticellate, ultimately minutely rusty-puberulous. Leaves 5-10 by 4-5 in., elliptic, shortly acuminate or obtuse, subcoriaceous, glabrous above, glaucescent, minutely rusty-puberulous beneath; lateral nerves 9-11 on either half, prominent beneath, arcuate; base acute; petiole 1.5-2 in. long. Peduncles 4-6 in. long, many-branched; cymes 5-6 flowered; pedicels slender, stellately puberulous above, 0.08 in. long. Perianth segments ovate, stellately puberulous; 3 outer 6-0.08 in. long, 3-nerved; 3 inner 0.08-1 in. long, 5-nerved, caducous in fruit. Stamens in 1st and 2nd series oblong; anther glabrous, glandulose-punctate; filaments villous, 0.04 in. long; in 3rd series outer anthers rectangular,
glandular punctate; filaments shortly villous, glands sub-glabrous, close to the base; staminodes (4th series) ·02 in. long, sometimes absent. Ovary ovoid, glabrous; style slightly oblique; stigma capitate. Drupe (immature) ellipsoid, glabrous; fruiting pedicel minutely pubescent.

CACHAR (Goolbelati near Dumcherra). (Kew Bulletin 1914. P. 188).

**A. dumicola W. W. Smith.**

A shrub (20'-25' tall), branches fulvous-tomentose. *Leaves* 5-8 by 2·5-4 in., obovate or sub-elliptic, rotundate, obtuse or shortly acute, coriaceous; base cuneate or sub-rotundate; lateral nerves 10 on either side, distinct. *Flowers* brownish in rather short panicles, about ·3 in. long; peduncles robust, rigid, densely fulvous-tomentose. *Perianth* segments 6, unequal, outside ones ·3 in. long, obov-lanceolate, somewhat fulvous-tomentose on both sides. *Stamens* 9, perfect, about ·2 in. long; staminodes (in the 4 in. series) somewhat villose. **Ovary** depressed, globose, about ·1 in. across, slightly villose.

Sheveli—Salween divide, Yunnan upto 8,000 feet.
(Notes Royal Botanic Gardens, Edinburgh, Nos. LXIII-LXIV Novr. 1921).

NAGA HILLS, ASSAM 6,000 feet (Bor Nos. 2662 & 5082, Kew Bulletin No. 5, 1938).

"A very large tree; excellent timber."

Flrs. 5. Fr. 7.

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**7. MACHILUS Nees.**

Evergreen trees; leaf buds lanceolate; buds of the inflorescence with imbricate scales. *Leaves* alternate, pinnerved. *Flowers* 2-sexual in axillary and pseudo-terminal panicles. *Perianth* tube short or 0; segments 6, sub-equal, of outer smaller, nearly always persistent and spreading or reflexed in fruit. *Perfect* stamens 9; filaments of the first and second series eglandular with introrse anthers; those of the third series 2-glandular and with extrorse anthers; staminodes of the fourth series cordate; all anthers 4-celled. **Ovary** sessile, narrowed into the style. *Berry* globose or oblong, seated on the persistent perianth, which is hardly enlarged; fruiting pedicel not swollen.
Fruit ellipsoid or oblong:—

Perianth segments glabrous or almost so:—

Perianth segments 2-25 in. long, linear-oblong. .. .. .. .. 1. M. odoratissima.
Perianth segments about 1 in. long, broadly elliptic or ovate. .. .. .. 2. M. parviflora.

Fruit globose:—

Perianth segments tomentose or silky:—

Leaves densely tomentose beneath:—

Fruit 1 in. across, seated on the reflexed perianth. .. .. .. 3. M. villosa.
Fruit 1·5 in. across, seated on stout pedicel (perianth almost deciduous). .. 4. M. edulis.

Leaves glabrous or finely pubescent:—

Filaments hairy at base only:—

Leaves adpressed, silky beneath:—

Fruit about 25 in. across:—

Lateral nerves 6-8. .. .. .. 5. M. bombycina.

Leaves quite glabrous:—

Fruit 3-4 in. across:—

Lateral nerves 7-12. .. .. .. 6. M. Gamblei.


A middle sized tree. Bark dark-grey, somewhat rough outside upto 7 in. thick; blaze somewhat granular, soft, light or pinkish brown with scattered lighter coloured tissue, darkening on exposure; twigs glabrous. Leaves crowded at the ends of branches, 3-7·5 by 1-2·5 in., very variable in shape, ob lanceolate, oblong-lanceolate, elliptic-oblong or -obovate, shortly acuminate or acute; glabrous, dark green and shining above, paler and slightly glaucous beneath; base cuneate, acute or obtusely narrowed; main lateral nerves slender, usually 7-13 on either side; nervules prominent in dry leaves with minute impressed spaces between; petioles 3-7 in. long, channelled. Panicles subterminal, upto 5 in. long, peduncled, glabrous. Flowers yellowish-green, scented. Perianth tube obsolete; segments 2-25 in. long, narrow-oblung; outer slightly smaller, glabrous or puberulous outside, more or less villous within, at least towards the base. Filaments hairy near the base or glabrous. Fruit 5-7 in. long, oblong or ellipsoid, purple and primrose when ripe.
KHASI HILLS ascending upto 6,000 ft., distribution doubtful in the plains. Some sheets from Sylhet (Nos. 6895, 4916) and Sibsagar (No. 3558) have been referred to this species, but I am inclined to regard them as being more nearly allied to *M. bombycina*. They have the glabrous inflorescence of this species. The flowers are rather small and the perianth segments are silky outside but less so than in typical *M. bombycina*, and the undersurface of mature leaves are minutely silky. There are no fruits. It appears that the Sylhet sheets represent a less hairy form of *M. bombycina*.

Frs. 3-4. Fr. 5-6.


A small tree. *Bark* grey or pale-brown, rough outside; blaze light-brown, viscid, green near the outer dead layers. *Leaves* variable, 3-8 by ∙7-2∙75 in., narrowly oblong, oblong-lanceolate or oblanceolate, obtuse, subacute or obtusely acuminate, glaucous beneath; main lateral nerves 8-12 on either half; nervules minutely reticulating on both surfaces (at least in dry specimen); petiole ∙5-·75 in. long. *Panicles* terminal and from upper leaf axils, long-peduncled, lax, few-flowered, at first thinly pubescent, glabrescent with age, 1-5-5 in. long. *Flowers* greenish yellow, about ∙1 in. long pedicels about ∙2 in. long, stout. *Perianth* subglobose, glabrescent with age, obscurely puberulous within; lobes broadly elliptic or ovate, short. *Filaments* nearly glabrous. *Ovary* glabrous. *Fruit* 6-75 in. long, ellipsoid.

KHASI HILLS, 4-5,000 ft.

Frs. 9. Fr. 2.


A moderate-sized tree with spreading crown. *Bark* dark-grey to light-brown, rough outside, reddish-brown to whitish with brown specks inside, darkening on exposure, about ∙6 in. thick; young shoots and inflorescence rusty or grey-tomentose. *Leaves* 3-7 by 1-2·5 in., elliptic to lanceolate or oblanceolate, usually acuminate, less often acute or obtuse;
pale and shining above, purplish-brown or brown beneath; lateral nerves 6-8 on either side, strong; petiole 3-1 in. long. *Panicles* upto 6.5 in. long, subterminal, fascicled with spreading subcorymbose branches; peduncles stout; pedicels short, stout. *Flowers* about 2 in. across, densely ferruginous, tomentose outside; lobes broad, usually elliptic or elliptic-lanceolate, obtuse or sub-acute, pubescent within, about 1 in. long, enlarged, reflexed in fruit. *Filaments* glabrous. *Berry* globose, about 1 in. across.

DARRANG, NOWGONG, GOALPARA, GARO HILLS.
The wood makes good fuel.

**Frs. 12-3. Fr. 5.**


Branchlets thick; leaf scars prominent; shoots and inflorescence silky villous. *Leaves* 3.5-8 by 1.5-3 in., obovate-oblong, or oblanceolate, apiculate, more or less abruptly short-acuminate or obtuse, undersurface pubescent or glabrate, thinly coriaceous; lateral nerves prominent beneath, 10-12 on either side; petiole 5-75 in. long. *Panicles* pedunculate, 2.5-6 in. long. *Flowers* 25 in. across. *Perianth* lobes oblong or elliptic, more or less hairy on both surfaces. *Filaments* villous. *Fruit* 1.5-2 in. across, on stout, woody peduncles with no trace of perianth.

DAFFLA HILLS, ABOR HILLS, etc.

**Frs. 5. Fr. 2.**


A middle-sized tree with spreading branches. *Bark* light or dark-grey, rather rough; blaze mucilaginous, reddish-or pinkish-brown; young shoots and inflorescence silky. *Leaves* 2.5-5 by 8-2 in., elliptic-lanceolate to obovate-lanceolate, oblanceolate or oblanceolate, acuminate or sub-acuminate; coriaceous, glabrous above, adpressed silky beneath when young, minutely silky or puberulous with age; base cuneate or acute; lateral nerves 6-8 on either half, slender; petiole 3-7 in. long. *Panicles* sub-terminal, upto
4.5 in. long, branches spreading; pedicels upto 0.35 in. long, silky. *Flowers* about 0.25 in. long. *Perianth* tube obsolete; segments oblong or oblong-lanceolate, silky on both surfaces, often more densely outside except towards the base, inside villous with spreading hairs. *Filaments* villous at the base. *Fruit* globose, 0.25-0.3 in. across.

Throughout the province—natural and cultivated, ascending to an elevation about 1,500 ft. in the KHASI & JAIN'TIA HILLS. Muga silk worms are reared on the tree.


A medium-sized to often a large tree in our area. *Bark* greyish brown or dark grey, buttressed at the base, warty, often with horizontal wrinkles and rough; outside light reddish-brown or nearly white with streaks of darker tissue; inside upto 0.75 in. thick; young parts silky-pubescent. *Leaves* 2.5-6 by 7.2-2 in., variable, obovate-oblong, oblongate or lanceolate to elliptic, acuminate, thinly coriaceous, glabrous or nearly so, glaucous and pale beneath, gradually narrowed to a cuneate or acute base; main lateral nerves 7-12 on either half; petiole 0.3-1 in. long, slender, glabrous or pubescent. *Flowers* yellowish-green, about 0.25 in. long, in lax few-flowered, pubescent panicles, 1-4 in. long, from the bases of the new shoots or upper portions of old ones; pedicels about 0.25 in. long. *Perianth-tube* divided nearly to the base; lobes oblong or narrowly oblong-lanceolate, silky pubescent on both surfaces, more densely within. *Filaments* slightly hairy at the base. *Fruit* 0.3-4 in. across, globose, black and primrose when ripe.

N. E. FRONTIER. SIBSAGAR, Jorhat, KHASI HILLS, 3-4,000 ft. Mann! GOALPARA, GARO HILLS.

Flrs. 1-4. Fr. 6-7.


A moderate-sized tree with spreading branches; young parts and inflorescence brown pubescent or tomentose. *Bark* dark-brown and rather rough outside; blaze nearly white to reddish inside. *Leaves*
crowded at the ends of branches, 5-10 by 1·25-3 in., oblong-lanceolate to elliptic or obovate, usually shortly acuminate, sometimes sub-obtuse, glaucous beneath; main lateral nerves strong, arched, 10-14 on either side; nervules prominently reticulate on both surfaces; petiole 5-1·5 in. long. Panicles upto 5 in. long, peduncled from upper leaf axils; buds subglobose, tomentose. Perianth 15 in. across; lobes broadly ovate or elliptic-ovate. Filaments very short. Ovary glabrous. Fruit not seen.

KHASI HILLS, 4,500-5,200 ft. Sheets Nos. 5977 (Nongstom) and 6417 (Shaith-sa-thiyat) have been referred to this species at the Calcutta Herbarium.

Frs. 9.

Machilus Kingii Hk. f.

A small tree. Bark grey warty and slightly reticulately fissured; blaze white with brown strands, green at the edges; scales of leaf buds rounded, silky outside. Leaves 6-10 in. long, elliptic-lanceolate or oblong-lanceolate, coriaceous, glaucous beneath; lateral nerves 8-10 on either side, slender; petiole 5-1 in. long. Panicle slender, sparsely puberulous. Flowers 3 in. across; lobes adpressed-pubescent on both surfaces. Filaments nearly glabrous.

Our sheet No. 6459 from KHASI HILLS, Sutnga has been referred to this species at Calcutta, but the determination is not satisfactory in view of the incomplete material.

Machilus sericea Bl.

A middle-sized tree. Bark dark brown, rough and fissured, about 5 in. thick; blaze coarsely granular, brown, aromatic; branchlets stout; young parts and inflorescence silky tomentose. Leaves 4-8 by 8-1·7 in., rather variable, oblong to lanceolate, acuminate, acute or obtuse; base narrowed, glabrescent above, glaucous beneath with age, coriaceous, finely reticulate on both surfaces; lateral nerves slender, 12-15 on either side; petiole 7-1·5 in. long. Panicles long-peduncled with short branches, 4-8 in. long; pedicels short. Flowers about 15-2 in. across, hairy on both surfaces. Filaments short, hairy. Fruit not seen.

GARO HILLS.

Probably little more than a silky form of M. odoratissima.

Frs. 3.


A tall tree. Bark smooth, greyish; young parts glabrous; bud-scales sericeous. Leaves 2-6 by 5-2 in., lanceolate, oblong-lanceolate or elliptic-lanceolate, bluntly acuminate, coriaceous, glabrous, glabrescent beneath, slightly hairy along the nerves; midrib impressed above. pro-
minent beneath; lateral nerves indistinct, about 7-12 on either half; base cuneate; petiole 3-7 in. long. Flowers in peduncled cymes, glabrous, arranged in panicles in the axils of terminal leaves, branches divergent; pedicels 1-2 in. long, elongating, about 4 in. in fruit. Perianth lobes 6, sub-equal, reflexed, 3-7 nerved, slightly accrescent in fruit; outer slightly smaller and narrower, oblong, acute, thinly pubescent, puberulous or glabrescent outside, glabrous inside (but very sparsely pubescent towards the base), 15-18 by .05 in.; inner lobes 2-25 by .07 in., more acute, oblong to lanceolate, pubescent on both sides, more so inside, with large hairs. Stamens I & II series equal; filaments almost glabrous with spreading silky hairs at the base, .07-.5 in. long; III series slightly larger, biglandular at the base; glands oblong-ovate, stipitate; stipes silky hairy; staminodes (IV series) with spreading silky hairs at the base, stalked, hastate. Ovary globose, glabrous, slightly stipitate; style subulate, .05 in. long; stigma discoid. Fruit globose, .4 in. in diameter, glabrous, seated on the persistent base of the perianth.

Type Sheet No. 10640, (Shillong Forest Herbarium, A. Das); NOWGONG (Diphu); DARRANG.

It is a large tree. The timber is extensively used as "Bonsum" but is not so much durable and the quality is much inferior.

Frs. 4-5. Fr. 7-8.

**Machilus Listeri King.**

A tall tree. Leaves 2.5-3.5 by 1.3-2.5 in., elliptic-oblong, oblanceolate, obovate, oblong-acute or abruptly blunt-acuminate, entire, coriaceous, glabrous, glaucous beneath; lateral nerves 8-12 on either side, sub-parallel, slender, prominent beneath; base cuneate or narrowed into the petiole; petiole 5-8 in. long. channelled above. Fruit globose, .8-1 in. across.


A tall tree; branchlets blackish. Leaves 4-5 by 2-2.5 in., elliptic or elliptic-ovate, entire, bluntly acute, coriaceous, glabrous; lateral nerves 8-10 on either half; base acute; petiole .8 in. long. Inflorescence terminal panicle. Perianth segments sub-equal, .04-.06 in. long; inner series slightly longer, .15-.2 in. long, oblong-lanceolate to ovate-oblong, sub-acute, pubescent outside; outer series glabrescent or puberulous inside with age; inner series persistently pubescent. Stamens of series III largest; filaments .07-.12 in., sparsely pubescent at the base outside, more or less glabrous on the inner surface; glands of III series stipitate, cordate or auriculate at the base; apex rounded; stipes pubescent; staminodes bluntly cordate or hastate, stalked; stalks villous outside.
with spreading hairs. *Ovary* glabrous; style subulate; apical portion early deciduous.

Type Sheet No. 10778 (Shillong Forest Herbarium) SIBSAGAR.

Flrs. 9.

It could not be matched in India. It appears to be a new species of *Machilus* near *Machilus rimosa* Bl. In the absence of fruiting specimen it could not be definitely described as a new species.

The timber is sold as a second class "Bonsum." In appearance also the timber resembles true "Bonsum" to a great extent.

8. PHŒBE Nees.

Shrubs or trees, evergreen. *Leaves* alternate, often crowded at the ends of the branchlets, penni-nerved. *Flowers* hermaphrodite or polygamous in axillary or subterminal peduncled panicles; perianth tube short; segments 6, sub-equal, erect, accrescent in fruit and clasing the base. *Stamens* 9, perfect, I and II series introrse, eglandular; filaments slender; III series extrorse with 2 large stipitate glands at the base; staminodes of 4th series cordate or sagittate, stipitate; anthers 4-celled. *Ovary* usually globose; stigma discoid. *Fruit* hairy, ovoid-ellipsoid or globose; seated on the hardened accrescent perianth segments; testa thin; cotyledons fleshy.

Fruiting perianth segments adpressed, rigid:—

Perianth glabrous:—

1. *P. lanceolata.*
   - Leaves glabrous, lanceolate, .8-2 in. broad.
   - Leaves glabrous, linear-lanceolate, .3-.4 in. broad.

2. *P. angustifolia.*
   - Perianth silky or pubescent:—
     - Lateral nerves 8-12:—
       - Leaves puberulous or glabrous beneath; young shoots minutely puberulous.
       - Leaves pubescent beneath; young shoots ferruginous-tomentose.
     - Lateral nerves 15-20; under side of pedicels rusty-tomentose with long soft hairs; young shoots rusty-tomentose. Fruit ellipsoid, .5 in. long.

3. *P. pallida.*
   - Fruiting perianth segments coriaceous:—
     - Perianth softly tomentose in flowers:—
       - Lateral nerves 10-12; fruit .6-.9 in. long; perianth puberulous outside, minutely villous inside the base.

4. *P. paniculata.*
   - 5. *P. attenuata.*

5. *P. goalparensis.*
Perianth grey tomentose outside, glabrous inside:—lateral nerves 10-14, fruit 1-17 in. long. . . 7. *P. Cooperiana*.


A small or middle-sized tree. *Bark* greyish, fairly smooth, (with very shallow fissures) exfoliating in pieces, about 3 in. thick; inside light-brown, somewhat fibrous, darker, (bark smells like cinnamon). *Leaves* 3.5-8 by 1.2-3 in., lanceolate, oblong-lanceolate or elliptic-lanceolate, long-acuminate, thinly coriaceous, glabrous (pubescent beneath when young), glaucous beneath; lateral nerves 6-10 on either half, ascending; base cuneate; petiole 2-9 in. long. *Flowers* yellowish green, in lax, long-peduncled, corymbiform panicles usually clustered laterally at the base of new shoots; bracts silky, pubescent, deciduous, upto 5 in. long; bracteoles minute. *Perianth* glabrous, 1 in. long, cup-shaped; segments ovate or elliptic, sub-acute or obtuse, enlarging in fruit, glabrous outside, pubescent within. *Inner stamens* hairy. *Staminodes* of 4th series villous, stipitate, cordate. *Ovary* glabrous; style slender. *Berry* black, ovoid or ellipsoidal, 3.5 in. long.

Fairly common in KAMRUP, SIBSAGAR, NOWGONG, DAR-RANG. N. C. HILLS, GOALPARA, NAGA HILLS, KHASI & JAINTIA HILLS, (upto 5,000 ft.).

Leaves used for cattle and buffalo fodder. Ash of the berries is said to cure sores.

Frs. 4-5. Fr. 10-11.

2. **Phoebe angustifolia** Meissn.

A shrub or small tree. *Leaves* pale green, 2.7 by 3.7 in., narrow-lanceolate, caudate-acuminate, coriaceous, glabrous; lateral nerves 7-11 on either half, very slender, arcuate; base cuneate or narrowed into the petiole 3.7 in. long. *Flowers* greenish, corymbiform at the ends of long peduncled panicles. *Perianth* glabrous; segments 12 in. long. *Fruit* ellipsoidal, 3-4 in. long, glabrous, smooth.

GARO HILLS, KHASI & JAINTIA HILLS. (2,500-4,000 ft.).
3. Phœbe pallida Nees.

A small or middle sized tree; young parts pubescent. Bark reddish-brown. Leaves 3-8 by 9-1-5 in., oblong-elliptic or elliptic, lanceolate, acuminate, minutely pubescent when young, glabrous when mature, shining green above, glaucous beneath; lateral nerves 6-9 on either half; base acute or cuneate; petiole 2.6 in. long, channelled above. Flowers 2 in. across, greenish yellow, in lax puberulous peduncled panicles upto 5 in. long round the side of the new shoots (not clustered). Perianth 1 in. long; segments ovate, pubescent without and within, enlarged in fruit. Stamens shorter than the perianth, glandulose; staminodes hirsute, sagittately cordate, acute. Ovary obovate; style filiform, glabrous; stigma trigonous. Fruit 4-5 in. long, ellipsoidal.

KHASI HILLS.

Flrs. 6-7. Fr. Cold season.


A tall tree; young shoots rusty-tomentose. Bark dark-grey, reticulately fissured, about 8 in. thick, fibrous, at first cream coloured, turning brown. Leaves crowded at ends of twigs, 3-8.5 by 1-8.5 in., elliptic, oblong-elliptic, (oblong-obovate or oblong-elliptic Khasi Hills form) acuminate, coriaceous, pubescent beneath and also sometimes on the midrib above; lateral nerves 6-12 on either half, prominent beneath; base cuneate or narrowed into the petiole 3-7 in. long. Panicles sub-corymbose, pubescent, arising laterally from new shoots; peduncle slender, 3-4 in. long; bracteoles subulate. Flowers small, grey or ferruginous-tomentose. Perianth segments ovate, laciniate. Stamens glandulose; staminodes capitate. Ovary subglobose, whitish, shaggy; style filiform, twice longer than the ovary, glabrous or sparsely hairy; stigma small, pale, obscurely dentate. Fruit 3-5 in. long, somewhat quadri linear, ovoid, obtuse, reticulately rugose, blackish; seeds obovate, testa crustaceous.

DARRANG, KHASI HILLS. (Borapani upto 3,000 ft.).

Flrs. 3-5. Frs. 9-11.

Sometimes a very large tree (100'-112'). *Bark* dark-grey exfoliating in papery flakes; inside greyish-brown, mottled with coarse grains of dark-brown; young parts rusty-tomentose with long soft hairs. *Leaves* crowded at the ends of branchlets, 5-10 by 1·5-3 in., oblong or oblanceolate, entire, coriaceous, ferruginous-tomentose beneath; lateral nerves 15-20 on either half; tertiaries parallel; base cuneate or narrowed into a short petiole ·5 in. long. *Flowers* ·25 in. across, tomentose, in pedunculate spreading panicles; peduncles stout, 3-6 in. long. *Perianth* rigid, campanulate; segments coriaceous, subtomentose. *Stamens* in series III somewhat shorter than the perianth; filaments linear, narrow, longer than the anthers by half; anthers pellucid-punctate; staminodes triangular, sagittate. *Ovary* globose, depressed; style slightly longer, filiform; stigma oblique, tridentate. *Fruit* ·5 in. long, narrowly ellipsoid.

KHASI HILLS (up to 3,000 ft.).

One of the most valuable local timbers known as 'Bonsum.' The quality and the economic uses are the same as that of *P. goalparensis* Hutch.

Flrs. 3-4. Fr. 9-10.


A tall timber tree. *Stem* buttressing at base. *Bark* greenish or blackish-grey, reticulately furrowed; branches ultimately minutely puberulous, blackish; lenticels large, partly sunk. *Leaves* 2·4-6 by 1·2-2 in., obovate or ovate-lanceolate, somewhat shortly or obtusely acuminate, rarely obtuse, rigidly chartaceous, glabrous, puberulous on the nerves beneath; midrib impressed above, prominent beneath; lateral nerves 9-12 on either half, distinctly prominent beneath, tortuous and getting obscure towards the margin; tertiaries rather prominent on both sides and tortuous; base narrowed or acute; petiole ·4-1 in. long, glabrous above, obscurely puberulous beneath. *Inflorescence* in long peduncled lax panicles; pedicels about ·2 in. long, ashy, minutely puberu-
lous; bracteoles minute, caducous. *Flower* buds ovoid, acute, 25-3 in. long. *Perianth* segments—outer 17 in. by 12 in., ovate, obtuse, coriaceous, puberulous outside, adpressed, villous inside towards the base; inner slightly longer, equipped with few inflexed hairs towards the apex on the inner side. *Stamens* slender; filaments pubescent in I and II series, 17 in. long; anthers oblong-ovoid, obtuse, 06 in. long, in III series somewhat larger, 2-glandular towards the base; glands cordate. *Staminodes* in IV series sagittate, shorter than the stamens (about half). *Ovary* depressed, globose, pubescent; style about 04 in. long. *Fruit* ellipsoid, blackish, about 6-9 in. long, glabrous.

**GOALPARA**, Type Sheet No. 5092 (U. N. Kanjilal) DARRANG, NOWGONG, SIBSAGAR. Commonly mistaken as *Phæbe Hainesiana* Brandis.

**Flrs.** 2-4. **Fr.** 6-8.

One of the most valuable timbers of Assam. Commercially known as “Bonsum” or “Assam teak” used for building structure, planking and furniture and all kinds of cabinet work in the Province.

It appears from the examination of the sheets of *Phæbe goalparensis* Hutchinson collected from different districts that there are slight local variations in inflorescence, leaves and fruits from the type (U. N. Kanjilal’s Sheet No. 5092) described by Hutchinson. These local variations, however, cannot be considered sufficiently distinguishing characters for further division into varieties or forms except the following two distinct varieties noticeable in the area where the type occurs. They are very characteristic even with the naked eye and I have described them as new varieties. Their points of difference are enumerated below:

**P. goalparensis** Hutch. Var. Martiniana Das.

Leaves almost similar to type, sometimes narrower. *Inflorescence* very much denser and congested, not at all lax; buds clavate, small and obtuse. *Perianth* segments unequal; outer series smaller in length, villous on both surfaces; ovary broader than long, villous all over.

**P. goalparensis** Hutch. Var. Boriana Das.

Leaves obovate or elliptic-ovate, broader; petiole slightly larger. *Inflorescence* very much lax; buds ovoid. *Perianth* segments ovate-lanceolate, blunt, very much thicker, accrescent in fruit. *Ovary* globular, thinly pilose at top. *Fruit* slightly bigger.

This variety approaches *P. Hainesiana* Brandis more or less.
The above-mentioned varieties are under further investigation. The timber cannot be at all technologically differentiated from the type and there is no difference in the commercial value of the timber of these varieties with that of P. goalpARENTIS Hutch. P. HAINSIANA Brandis has been recently recorded from Naga Hills.


A large timber tree (120'/14') ; bark greyish, exfoliating in flakes, shallowly and reticulately furrowed. *Branches* sparsely lenticellate; young shoots rusty-villous, ultimately puberulous. *Leaves* 5-11 by 2-4 in., alternate, obovate, oblong-lanceolate or obovate-oblong, entire, shortly or abruptly acuminate, rarely obtuse or acute, chartaceous, glabrous above, puberulous beneath, more so along the nerves and midrib; midrib impressed above, prominent beneath; lateral nerves 10-14 on either half, sub-parallel, curved towards the margin of the blade; tertiaries prominent beneath; base narrowed or cuneate; petiole 1.5-5 in. long, puberulous. *Inflorescence* puberulous, in long-peduncled panicles, crowded at the ends of branchlets; bracteoles obscure. *Buds* ovoid-obtuse, 1.5-3 in. long; pedicels 1.25 in. long, adpressed, silky villous. *Perianth* segments sub-equal, coriaceous, oblong, sub-acute, grey, tomentose outside, glabrescent with age inside, 2.25 in. long; the inner 26-3 in.; outer slightly broader, ovate to elliptic. *Stamens*—filaments 1.12 in., villous; anthers oblong, ovoid, 0.05-0.06 in. long; in the III series filaments broadened at the base, biglandular; glands irregularly stipitate; in the IV series staminodes villous, bluntly sagittate at the tip, narrowed towards the base, about 0.07 in. long. *Ovary* glabrous; *style* subulate, about 1 in. long. *Fruit* 1.1-5 in. long, ellipsoid, blackish, glabrous.

NORTH EAST FRONTIER TRACT (Kherim, Morkong-Sellek, Pasighat); DARRANG.

Type Sheet No. 7722 (H. L. Cooper, 1922). Fr. (A. Das 10634, 1934, Shillong Forest Herbarium).

Blaze reddish. Timber is very valuable in the N. E. F. Tract. Similar in structure to that of *Bonsum* (*Phæbe goalpARENTIS* Hutch), used for building works, planking, doors, etc., and also for furniture.

Flrs. 4-5. Fr. 7-8.
9. ACTINODAPHNE Nees.

Evergreen trees or shrubs. *Leaves* sub-verticillate, rarely opposite or scattered, pennis- or triple-nerved, usually coriaceous. *Flowers* dioecious in bracteate umbels, clusters or racemes; bracts caducous, imbricate. *Perianth-tube* short; segments 6, sub-equal. *Male flowers* :-stamens 9; filaments slender, glandular in 3rd series only; anthers introrse, 4-celled. *Pistillode* absent or present. *Female flowers* :-staminodes 9, linear or spatulate in 1st or 2nd row, biglandular in 3rd row. *Ovary* usually glabrous, ovoid, attenuate into the style; stigma dilated. *Fruit* seated on the enlarged hardened flat or concave perianth tube; testa thin; cotyledons thick, usually hemispheric.

Leaves pinnately, more or less verticillate :-

Leaves 4-10 in. long, coriaceous, glaucous beneath :-

- Fruit globose, ·3 in. across. .......... 1. *A. angustifolia*.

Leaves 3-6 in. long, coriaceous, pubescent beneath (not glaucous) :-

- Fruit broadly ellipsoid, ·5 in. long; pedicels longer than fruit. .......... 2. *A. reticulata*.

Leaves membranous, 3-6 in. long, glabrous (not glaucous) :-

- Fruit oblong, about ·6 in. long, in sessile or sub-sessile clusters. .. 3. *A. sikkimensis*.

Leaves almost triple-nerved, sub-verticillate, some leaves 10-18 in. long :-

- Branchlets, leaf buds and leaves rusty-pubescent :-

- Fruit ellipsoid, ·6-1 in. long. .......... 4. *A. obovata*.


A large or moderate-sized tree. *Bark* greyish with white patches, about ·3 in. thick; inside brownish, somewhat granular, faintly mottled; blaze yellowish, turning brown; young parts rusty-tomentose. *Leaves* 4-10 by 1·5-2·5 in., oblanceolate, lanceolate or elliptic, bluntly acuminate or attenuate, coriaceous, shining above, rather glaucous beneath; lateral nerves 6-10 on either half, slender, oblique,
prominent beneath; petiole ·3·7 in. long. Flowers in short-ly peduncled, umbellate, tomentose clusters. Fruit globose, ·3 in. across (in bundles), seated on a small cup-shaped entire perianth tube.

Fairly common.
Wood cream coloured.

Flrs. 9. Fr. 12.

2. Actinodaphne reticulata Meissn.

A small tree; bark brown; young parts minutely pubescent. Leaves 3-5 by ·8·1 in., elliptic-lanceolate or narrow-lanceolate, acuminate, thinly coriaceous, shining above, very finely pubescent beneath; lateral nerves 10-12 on either half; reticulated veins, conspicuous on both surfaces; base cuneate or acute; petiole ·15·6 in. long. Flowers clustered; bud-scales nearly glabrous. Fruit broadly ellipsoid, ·5 in. long, black, seated on the entire cupular perianth tube; fruit-ing pedicel about ·75 in., cup about ·3 in. across.

Mawsmai, KHASI HILLS (4-5,000 ft.).
Flrs. 6. Fr. 10-11.

3. Actinodaphne sikkimensis Meissn.

A tree; branchlets slender. Leaves 3-6 by ·6·1·2 in., lanceolate or linear-lanceolate, caudate-acuminate, membranous, glabrous, green and shining above, glaucous beneath; lateral nerves 10-12 on either half, very slender; base acute or cuneate; petiole ·2·4 in. long. Female flowers densely clustered, pedicelled or sub-sessile; bracts 2·4 to each flower. Style glabrous. Fruit oblong, ·6 in. long, seated on the very small, quite entire base of the perianth.

MANIPUR (5,000 ft.). (Watt’s No. 5904).
Flrs. 1. Fr. 5.

4. Actinodaphne obovata Blume. Vern. Tala, Tipp.; Pati-honda, Petarichowa, Pajihuta, Ass.; Banji, Mech; Dieng-
la-sata, Dieng-sala-bung-kron, Kh.; Diend-lakrao, Synt.; Bolring-ranjak, Garo.

A large or middle-sized handsome tree. Bark greyish-brown, exfoliating in thin papery flakes, about 2 in. thick; young parts rusty-pubescent. Leaves 7-18 by 2.5-6 in., obovate or elliptic-oblong, acute or obtuse, thinly coriaceous, shining above, rather bluish-white beneath; almost 3-ribbed at the base (or slightly above the base); lateral nerves 4-6 on either half, prominent beneath (including base); base rounded or obtuse; petiole 1.2-5 in. long. Male flowers 5 in. across, in clusters. Perianth tube short; segments membranous. Female flowers smaller in panicled racemes; pedicel about 1.5 in. long in fruit, stout. Style glabrous. Fruit ellipsoid, 6-1 in. long, seated on the entire cupular perianth tube; cup dilated, 3-6 in. across.

LAKHIMPUR, SIBSAGAR, KAMRUP, SYLHET, NAGA HILLS, MANIPUR, GARO HILLS & KHASI HILLS.

Flrs. 3. Fr. 7.

Var. Wattii King. Leaves very large 18.5 by 8 in., pubescent on the nerves beneath. Inflorescence purplish-brown, silky. MANIPUR (5,000 ft.). (Watt’s No. 6331).

Flrs. 4.

10. LITSÆA Lamk.

Trees, rarely shrubs, usually evergreen, rarely deciduous. Leaves as a rule alternate, rarely opposite or sub-opposite, penni-nerved, leaf-buds naked or scaly. Flowers dioecious in umbellules of 4-6, rarely more flowered; unbellules sessile or peduncled in clusters or racemes, rarely solitary; involucre bracts 4-6 in., rarely more, concave. Male flowers-perianth tube obsolete or very small. Stamens normally 9-12; filaments of I & II series eglandular, that of III & IV series if present 2-glandular; anthers generally introrse, 4-celled. Ovary 0 or rudimentary. Female flowers-perianth tube ovoid or campanulate; segments normally 6, equal or unequal. Staminodes arranged like male flowers, outer rows linear or clavate, inner rows subulate, 2-glandular. Ovary enclosed in the perianth tube or free; style thick, often armed; stigma
irregularly lobed. *Berry* globose, ovoid, ellipsoid or oblong, seated on the unaltered perianth or on the enlarged perianth tube, with more or less thickened and lengthened pedicel; pericarp usually succulent.

Leaves deciduous, pinnately-nerved:—
Perianth not enlarged in fruit; segments 6.

Leaves deciduous, pinnately-nerved:—
Peduncles slender; filaments usually hairy; petiole 5–9 in. long. 1. *L. citrata.*

2. *L. Kingii.*

Peduncles stout; filaments glabrous; petiole 3–4 in. long.

Leaf buds and peduncles golden brown; filaments hairy; young parts with long silky hairs; petiole 3–5 in. long. 3. *L. sericea.*

Leaves persistent, pinnately-nerved:—
Perianth segments obsolete or incomplete; tube scarcely enlarged in fruit.

Leaves coriaceous; umbellules in corymb or racemes; petiole 6–1.8 in. long. 4. *L. sebifera.*

Leaves membranous; umbellules solitary; petiole 5-1.5 in. long. 5. *L. membranifolia.*

Perianth segments 6, tube scarcely enlarged in fruit:—
Leaves rusty, alternate, pubescent beneath. 6. *L. polyantha.*

Leaves glabrous beneath or nearly so:—
Leaves opposite or sub-opposite (sometime alternate):—
Stamens about 6; lateral nerves 6–8 on either half; petiole 2–4 in. long. 7. *L. lancifolia.*

8. *L. mishmiensis.*

Stamens 9; lateral nerves 12–16 on either half; petiole 5–8 in. long. 8. *L. mishmiensis.*


Stamens 9; filaments villous; lateral nerves 5–7 on either half; petiole 1–3 in. long. 9. *L. assamica.*

Perianth segments usually 6, tube much enlarged in fruit, umbellules solitary or in clusters:—
Leaves pubescent or tomentose beneath:—
Berry about 1 in. across, umbellules 6–8 flowered; enlarged perianth tube fleshy, turbinate. 10. *L. khasyana.*

Berry about 1.7 in. across, umbellules 6-flowered; enlarged perianth tube cup-shaped, entire. 11. *L. semecarpifolia.*
Berry about 3 in. across, umbellules 4-5-flowered; enlarged perianth tube spreading, more or less lobed.... 12. *L. elongata*.

Leaves glabrous beneath or nearly so:—
Fruit ellipsoid or almost so:—
Filaments densely pilose; fruit 3 in. long:—
   Leaves up to 2 in. broad; petiole 3-5 in. long... 13. *L. salicifolia*.
Filaments spreading, hairy; fruit 4-5 in. long:—
   Leaves not more than 1.5 in. broad; petiole 2-3 in. long... 14. *L. angustifolia*.

Fruit oblong or oblong-ovoid:—
Leaves up to 10 in. long:—
   Bracts glabrous; male heads corymbs; lateral nerves 8-11... 15. *L. oblonga*.
   Bracts tomentose; male head fascicled; lateral nerves 6-9... 16. *L. laeta*.
Leaves not more than 6 in. long:—
   Bracts silky long; heads 4-flowered; lateral nerves 7-10 pairs... 17. *L. meissneri*.

Fruit globose, depressed:—
Leaves 5-10 by 2-3 in.; lateral nerves 6-13 pairs; male heads corymbosely racemep... 18. *L. Thomsonii*.

Fruit ellipsoid:—
Heads in axillary racemes:—
   Male racemes 2-4 in. long; heads 4-5-flowered; leaves thinly coriaceous... 19. *L. nitida*.
   Male racemes 5-7 in. long, drooping, fruit globose; heads 6-flowered; leaves finely coriaceous. 20. *L. Panamonja*.

Leaves persistent, sub-triplinerved:—
Heads in sessile (or almost sessile) cluster:—
Perianth turbinate; segments 4, deciduous, tube not enlarged in fruit:—
Stamens 6, the 2 inner 2-glandular:—
Fruit oblong-ovoid:—
Leaves 5-12 in. long:—
   Leaves rigidly coriaceous, crowded at the ends of branchlets:—
   Young shoots silky:—
   Fruit 5-6 in.... 21. *L. lanuginosa*. 

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*Species mentioned:*
- *L. elongata*
- *L. salicifolia*
- *L. angustifolia*
- *L. oblonga*
- *L. laeta*
- *L. meissneri*
- *L. Thomsonii*
- *L. Panamonja*
- *L. nitida*
- *L. Panamonja*
Leaves thinly coriaceous, glaucous beneath with a white bloom:—
Young shoots minutely silky:—
Fruit \( \cdot 4 \cdot 5 \) in. long. \( \ldots \) 22. \( L. \) umbrosa.

Fruit globose:—
Leaves \( 1 \cdot 5 \cdot 3 \) in. long:—
Leaves coriaceous, scattered (alternate).
Young shoots silky-pubescent:—
Fruit \( \cdot 08 \) in. across. \( \ldots \) 23. \( L. \) Mannii.


A small tree, deciduous, aromatic. Bark green, warty, thin; blaze yellowish, turning brownish (young stem green but discs quite black) somewhat mucilaginous; young shoots silky; leaf buds naked. Leaves somewhat inequilateral, 3-6 by \( \cdot 8 \cdot 1 \cdot 6 \) in., lanceolate or narrow ovate-lanceolate, caudate-acuminate, membranous, bright green above, glaucous beneath; lateral nerves 8-13, slender, arcuate; midrib often purplish below; base somewhat oblique-acute; petiole slender, \( \cdot 5 \cdot 9 \) in. long. Flowers in capitate umbels solitary or in corymbs; bracts 4, ovate, membranous, glabrous, ciliate at the edges; peduncles slender, about \( \cdot 5 \) in. long; pedicels villous. Sepals membranous, obovate, sub-equal. Fruit \( \cdot 25 \cdot 3 \) in. across.

Fairly common throughout the Province, (upto 5,500 ft.), also MANIPUR and NAGA HILLS.

Often gregarious on abandoned fire lines or jhummed area. Wood white. Pat silk worms (Assam silk) are reared on the leaves of this tree.

Frs. 11-2. Fr. 6-7.

2. \( Litsœa \) Kingii Hk. \( f. \).

A deciduous shrub, aromatic; branches stout, allied to \( Litsœa \) citrata. Leaves 3-5 by \( \cdot 8 \cdot 1 \cdot 5 \) in., elliptic-lanceolate, acute or shortly acuminate, thinly coriaceous, glaucous beneath; base acute; petiole \( \cdot 3 \cdot 4 \) in. long. Peduncles stout; umbellules solitary or few and corymbs 5-flowered. Perianth


It appears from the herbarium sheets at Sibpur that the sheets were originally identified as *Litsaea citrata*. The points of distinction merge in intermediate forms. No specimen in Forest Herbarium, Shillong.

Flrs. 3-7. Fr. 9-12.

### 3. *Litsaea sericea* Wall.

A middle-sized deciduous tree, aromatic; young parts silky hairy; branches stout, blackish; leaf-buds punctate. *Litsaea citrata*. *Leaves* 3-5 by .8-1.5 in., elliptic-lanceolate, late, acute or acuminate, sub-coriaceous, clothed with brown-silky tomentum, specially when young; lateral nerves 8-12 on either half; base acute; petioles .3-.5 in. long, tomentose. *Flowers* .16 in. across (before leaves) in umbel; peduncles golden-brown, tomentose; bracts glabrous. *Perianth* segments rounded, hairy at the base within. *Stamens* 12; *filaments* hairy. *Ovary* ovoid; style short; stigma large. *Fruit* sub-globose, .2 in. across, seated on the small flat perianth tube, fruiting pedicel rather stout, about .8 in. long.

MANIPUR (Watt No. 6,474, 6,518) 8,000-9,000 ft.

Flrs. 4. Fr. 10.


A middle-sized evergreen tree; young parts grey, tomentose or pubescent; branches lenticellate. *Bark* greyish brown, rough, warty; blaze, yellowish, mottled-brown, turning black, mucilaginous. *Leaves* variable, 3-8 by 1-4 in., elliptic-oblong or ovate-lanceolate, acute, obtuse or shortly acuminate, entire, coriaceous or pubescent along the midrib, glabrescent above, sparsely pubescent or glabrous beneath; lateral nerves 8-13 on either half; base narrowed; petiole .6-1.8 in. long, tomentose. *Flowers* yellowish, about 2 in. across, in 8-12 flowered umbellules arranged in pedunculate lax corymbs;
pedicels 1-2 in. long; bracts 4-6, concave, rounded, tomentose, stalked. Perianth irregular, often obsolete. Stamens 9-20; filaments villous. Fruit 25-4 in. across, supported by the thickened club-shaped pedicel.

KHASI HILLS, ASSAM.
Part of the bark is valued medicinally as an emollient for boils, bruises and wounds. Infusion of the bark is used for dysentery. Wood greyish-brown, hard, close grained, durable and is not attacked by insects; weight about 46 lbs. per c. ft.

Ftrs. 4-7. Fr. Cold season.

5. Litsaea membranifolia Hk. f.
A middle-sized tree. Bark of branches reddish-brown; branches stout; young parts hoary-pubescent. Leaves alternate, 8-12 by 4-6 in., oblong-ovate, obtuse or apiculate, membranous, green, rarely glaucous, rather pubescent beneath; lateral nerves 10-14 on either half, slender; base cuneate; petiole 5-1 in. long. Heads solitary, large, 1 in. across (opening). Flowers and pedicels villous; bracts 4. Perianth incomplete; segments unequal. Filaments slender, sparsely villous.


A tree often attaining a large size (60'/6') with spreading crown; young parts rusty-tomentose. Bark greyish-brown, somewhat rough, 7-8 in. thick; inside reddish-brown, outer edge of blaze gradually light with strands of reddish-brown which are closely packed near the outer edges, gradually further and further apart inward. Leaves 3-8 by 3-4 in., obovate-oblong, oblanceolate or elliptic-oblong,
acute or rounded, coriaceous, dark green and glabrescent above, glaucous and rusty-pubescent beneath; lateral nerves 6-10 on either half, tertiaries scalariform, prominent; base rounded, somewhat oblique; petioles 5-1 in. long, pubescent. **Flowers** greenish yellow, 2 in. across, in pedunculate umbellate heads; peduncles 2-5 in. long; pedicels villous, about 1 in long; bracts 5, concave, orbicular, membranous. **Perianth** segments 5, nearly free. **Stamens** 9-13; filaments villous; glands stipitate. **Fruit** ovoid, 3-4 in. long, blackish when ripe, supported by the persistent perianth and the thickened pedicels.

Common all over the Province.
The bark is used in Indian Medicine. Muga silk worms are reared on the leaves. Wood not durable. (38 lb. per c. ft.).

Flrs. 3-5. Fr. 6-9, (also later).

**7. Litsæa lancifolia** Roxb ex Wall.

A shrub or a small tree, somewhat aromatic; young parts tomentose; stem dark-brown. **Bark** very thin, greenish-brown inside. **Leaves** opposite, sub-opposite or alternate, 3-6 by 1-2 in., narrow, oblong-acuminate, thinly chartaceous, glaucous beneath; midrib finely tomentose; lateral nerves 6-8 on either half, impressed above, prominent beneath; base acute or cunate; petiole 2-4 in. long. **Flowers** white in umbellate clusters 1 in. across; pedicels 15 in. long. **Sepals** villous, unequal. **Stamens** about 6, unequal. **Fruit** sub-globose or ellipsoid-oblong, 4-6 in. long, about 5 in. across, apiculate on the small flat perianth tube.

N.-E. F. TRACT, UPPER ASSAM, SYLHET, CACHAR, KHASI HILLS, (upto 3,000 ft.).

Flrs. 2-4. Fr. 4-6.

**8. Litsæa mishmiensis** Hk. f.

A large tree, glabrous; branches smooth, blackish; buds silky-tomentose. **Leaves** 4-6 by 1.5-2 in., oblong-lanceolate. acuminate, thinly coriaceous, glabrous, paler brown beneath; lateral nerves 12-16 on either half, slender; reticulation of nerves irregular and faint; base acute; petiole 5-8 in. long.
Litsœa. 115. LAURACEÆ. 85

Umbels solitary, 10-15-flowered; peduncles \( \cdot 5 \) in., pubescent; bracts 4-5, concave, coriaceous; pedicels \( \cdot 16-\cdot 3 \) in. long., pubescent. Perianth segments pubescent, oblong. Stamens 9; filaments glabrous. Fruit unknown.

UPPER ASSAM, MISHMI HILLS, (Griffith).


9. Litsœa assamica Hk. f.

Branches terete. Leaves 1·5-3 by \( \cdot 7-1\cdot 5 \) in., elliptic, ovate or sub-orbicular, acute or bluntly acuminate, thinly coriaceous, rather glabrous; lateral nerves 5-7 on either half, slender; base acute; petiole \( \cdot 1-\cdot 3 \) in. long. Umbels few and scattered. Flowers small; pedicels puberulous, \( \cdot 12-\cdot 15 \) in. long; bracts 4. Perianth segments 6. Stamens 9; filaments villous at the base. Fruit (immature) narrow-ellipsoid, apiculate, about \( \cdot 25 \) in. long.

ASSAM (Jenkins).


A small or middle sized tree (often attaining very large size. Bhoreli Reserve 100'/72" U. N. Kanjilal); young parts finely pubescent. Bark brownish, almost smooth with white patches and faint horizontal wrinkles, about \( \cdot 25 \) in. thick; inside pale yellow, turning brownish-yellow. Leaves 5-10 by \( 2\cdot 3-\cdot 5 \) in., oblong, oblong-lanceolate or elliptic-oblong, acute, coriaceous, glabrous above, glaucous, rusty-pubescent, ultimately glabrous beneath; lateral nerves 10-14 on either half, impressed above and quite stout and prominent beneath; base acute; petiole \( \cdot 4-\cdot 1 \) in. long. Flowers in umbellule heads; heads above \( \cdot 3 \) in. across; bracts 4; peduncles \( \cdot 2-\cdot 4 \) in. long. Perianth segments silky outside, glabrous within; stamens 7-9. Fruit depressed, globose, \( \cdot 8-\cdot 1 \) in. across, seated on the enlarged fleshy turbinate perianth tube.

N.-E. F. TRACT, LAKHIMPUR, SIBSAGAR, N. C. HILLS, KHASI HILLS, (2,000 ft.).

Flrs. 6-7. Fr. 10-1.

A small tree; young parts velvety-tomentose. *Bark* darkish-brown; inside light chocolate-brown, very finely fibrous and oblong, acuminate, coriaceous, glabrous above, pubescent and glaucous beneath; lateral nerves 8-12 on either half, strong, prominent below; base acute or cuneate; petiole ±4·6 in. long. *Flowers* umbellate in axillary clusters, often racemose, about 6-flowered; peduncles short, stout; bracts about 4. *Male flowers* ±25 in. across; perianth segments unequal, linear-oblong, pubescent; stamens about 8, pubescent; pistillode 0 or present. *Female* flowers smaller; perianth tube funnel-shaped. *Fruit* depressed, globose, about ±7 in. across, seated on the broad cup-shaped perianth tube.

DARRANG, GARO HILLS, MANIPUR, (4,200 ft.).
Flrs. 1-2. Fr. 3-6.


A small or moderate sized tree (50'/30''); young parts rusty-tomentose. *Bark* greyish or dakish brown, smooth, ±3 in. thick; inside light brown or somewhat pinkish mottled-brown. *Leaves* almost whorled, 5-10 by 1·5-2 in., elliptic-lanceolate, obovate or oblanceolate, acute or acuminate, coriaceous, shining above, pubescent when young, ultimately glabrous above, rusty-pubescent beneath; lateral nerves 10-18 on either half; tertiary nerves parallel; base acute or obtuse; petiole ±3·7 in. long. *Heads* 4-5-flowered, ±3 in. across, before opening, solitary or fascicled, axillary or extra axillary; peduncles stout, ±3·1 in. long; bracts coriaceous, ciliate. *Flowers* small, yellowish; male ±5-7 in. across, female smaller. *Perianth* segments 4-6, oblong, membranous. *Stamens* 8-12; filaments villous with long hairs; anthers oblong. *Ovary* glabrous; stigma discoid. *Fruit* ovoid, ±3 in. across, about ±5 in. long. apiculate, seated on the spreading more or less lobed enlarged perianth; fruiting pedicel tomentose. *Seed* white.

ASSAM, KHASI & JAINTIA HILLS, (5,000 ft.).
Flrs. 9-11. Fr. 4-5.

A small tree or shrub; branches silky pubescent, slender, horizontal. Bark greyish or chocolate-brown, 12 in. thick; blaze yellowish, turning dark-bown. Leaves 2.5-7 by 8-2.2 in., narrow-lanceolate or elliptic-oblong, acute or acuminate, chartaceous, glaucous and minutely silky pubescent beneath; lateral nerves 7-13 on either half; petiole 3-5 in. long, pubescent. Umbles 4-6-flowered, fascicled or sometimes racemose; peduncles villous. Perianth segments linear-oblong, 0.08 in. long. Stamens 6-7, both or inner 2 series glandular; filaments densely pilose. Fruit ellipsoid, 3 in. long, seated on the slightly enlarged, sub-cupular perianth.

LAKHIMPUR, SIBSAGAR, DARRANG, KAMRUP, GOALPARA, GARO HILLS, KHASI & JAINTIA HILLS, NAGA HILLS & NOWGONG, (ascending upto 6,000 ft.).

Flrs. 2-3. Fr. 4-5.

The following varieties are also in record in the region of this flora—L. attenuata & polyneura.


A bushy evergreen shrub, often sub-scandent; young parts finely pubescent. Bark darkish or greyish brown, smooth but with raised dots, 25 in. thick; inside light brown. Leaves 3-7 by 35-5 in., linear-lanceolate, sharply acuminate, coriaceous, glabrous, glaucous beneath; midrib very prominent beneath; base cuneate; lateral nerves 8-11 on either half, very slender, obscure above; petiole 2-3 in. long. Umbellules solitary or fascicled; male heads 16 in. across; peduncle slender, 25-3 in. long. Perianth segments oblong. Stamens 6-9; filaments sparsely hairy. Fruit ellipsoid-oblong, 4-5 in. long, smooth, seated on sub-cupular entire enlarged perianth tube; fruiting pedicels 15-2 in. long, stout.

SIBSAGAR, SYLHET, LUSHAI HILLS, CACHAR, MANIPUR, GARO HILLS.
Usually growing on rocks near water edge; forked stems of sufficient dimensions are used for single yoke for buffaloes.

Flrs. 3-5. Fr. 8-9.


A small tree (30'/30'') or a shrub. Bark cinnamon, grey or brownish, .1 in. thick; inside white but thinly yellowish-brown. Leaves 4-10 by 1-8-2-7 in., elliptic, elliptic-oblong or oblong-lanceolate, acuminate, acute or obtuse, coriaceous, glabrous; lateral nerves 8-11 on either half, strong and prominent below; base cuneate or acute; petiole .7-1-2 in. long. Umbellules 3-6-flowered, clustered on a short stalk, arranged in a manner to make them appear racemed; peduncles sparsely pubescent, .5-75 in. long; bracts sparsely pubescent. Fruit oblong, .5-6 in. long, seated on a sub-cupular perianth tube.

Dibrugarh, SIBSAGAR, KHASI & JAINTIA HILLS, (ascending upto 6,000 ft.).

Flrs. 9-10. (Flrs. in April in the Plains). Fr. 4.


A middle-sized (40'/55'') or small tree; young shoots usually finely ferruginous-pubescent. Bark greyish or brownish, about .3 in. thick; blaze brownish. Leaves 4-12 by .9-4-5 in., elliptic, lanceolate or narrow-oblong, shortly acuminate or acute, coriaceous, glabrous, pubescent beneath; lateral nerves 5-9 on either half, arcuate, prominent beneath, reticulations very fine; base acute; petiole .4-7 in. long. Umbellules in axillary clusters, rarely solitary, .5 in. across, 4-flowered; peduncles pubescent, .5 in. long; bracts 4-5, sparsely pubescent. Flowers cream-coloured; perianth segments oblong. Stamens 8-10; filaments hairy. Ovary 1-celled with 1 pendulous ovule; staminodes about 12. Fruit almost white, oblong-ovoid, .7 in. across, seated on the enlarged salver-shaped perianth, fruiting pedicel thickened, about .4 in. long.
N.-E. F. TRACT, GARO HILLS, KHASI & JAIN'TIA HILLS, (4,000 ft.) CACHAR, SYLHET, DARRANG, SIBSAGAR, LAKHIMPUR.

Brandis says "fruit black" from dried specimens; but almost all the fruits specimens are almost white in the local herbarium. I did not find any fruit of 1 in. in diameter.

Flrs. 11-1. Fr. 2-4.


A small or middle-sized tree, glabrous. Bark greenish-brown, warty, \( \cdot 12 \) in. thick; blaze yellowish, thinly brown. Leaves alternate, 2·5-6 by \( \cdot 8-2 \) in., elliptic-lanceolate or lanceolate, acuminate, coriaceous, glabrous, sub-glaucescent beneath; lateral nerves (primary) 7-10 on either half, with a few shorter intermediate ones also slender; base \( \cdot 1 \) acute; petiole \( \cdot 4-8 \) in. long. Heads usually pedunculate, 3-4-flowered; bracts 4, concave, coriaceous, fringed with brown silky hairs; Perianth segments 4, membranous, oblong. Stamens 9; filaments hairy. Fruit \( \cdot 7 \) in. long, oblong-ovoid, smooth. Seed bright red.

GARO HILLS, NAGA HILLS, KHASI & JAIN'TIA HILLS, (upto 6,500 ft.).

Flrs. 2. Fr. 4.

18. Litsæa Thomsonii Meissn.

A large tree; branches glabrous, stout. Leaves 5-10 by 2-3 in., elliptic-oblong, elliptic-lanceolate or narrow-oblong, acute or acuminate, rigidly coriaceous, brownish, shining above, paler beneath; lateral nerves 6-13 on either half, slender; tertiaries and quarternaries obscure; base acute; petiole \( \cdot 5-1 \) in. long. Umbel-heads rather corymbosely racemed; bracts puberulous. Fruit globose, depressed, \( \cdot 6-3 \) in. across; lower half included in the cupular perianth; fruiting pedicels thickened, spreading, \( \cdot 3-4 \) in. long.

SIBSAGAR (U. N. Kanjilal, No. 1685), SYLHET.

Flrs. 9. Fr. 8, (following year).

A middle-sized tree, glabrous. *Bark* grey, rough, about \( \cdot2 \) in. thick; inside creamy, yellowish, mottled with brown. *Leaves* 4-10 by 2-3 in., oblanceolate or oblong-ovate; obtuse, sub-acute, rigidly coriaceous, glabrous, dark green, shining, drying blackish; lateral nerves 7-12 on either half; base cuneate or narrowed into the stout petiole \( \cdot5-1 \) in. long. *Heads* 4-5-flowered, racemose, \( \cdot16-\cdot2 \) in. across, (before opening) glabrous. *Male* inflorescence 2-4 in. long; peduncles about \( \cdot5 \) in. long, slender; bracts unequal, glabrous. *Perianth* tube turbinate, silky. *Female* inflorescence 1-2 in. long; peduncles shorter than male. *Fruit* aromatic, yellowish, ellipsoid, \( \cdot5-\cdot7 \) in. long, half enclosed in the cupular perianth (enclosed in the obscurely lobed perianth when young).

N. C. HILLS, SYLHET, LAKHIMPUR, SIBSAGAR, NOWGONG, DARRANG, GOALPARA.

A timber tree. Wood used for posts etc.

Frs. 9-11. Fr. 1-4.

20. **Litsæa Panamonja** Buch. Ham.

A large tree; young shoots puberulous. *Leaves* 5-12 by 2-4 in., oblong or lanceolate, acuminate, coriaceous, glabrous above, pubescent or glabrescent beneath; lateral nerves 10-12 on either half; base cuneate or acute; petiole \( \cdot5-1 \) in. long. *Male* umbellules in tomentose racemes, 5-7 in. long, slender, drooping, 6-flowered, \( \cdot16-\cdot25 \) in. across, tomentose; bracts 4, coriaceous, concave, subequal. *Perianth* tube funnel-shaped; segments oblong. *Stamens* hirsute at the base. *Female* umbellules in short racemes. *Stigma* dilated. *Fruit* globose, \( \cdot3 \) in. across, enclosed in the cupular enlarged perianth (probably not quite mature).

ASSAM (Master), GOALPARA, SYLHET.

Frs. 3-4. Fr. 4-5.

21. **Litsæa lanuginosa** Nees.

A middle-sized or small tree; young shoots densely clothed with adpressed silky hairs. *Bark* brownish, slightly
rough, lenticellate. *Leaves* crowded at the ends of branchlets, 5-12 by 1.5-3 in., elliptic-lanceolate, oblong-lanceolate or elliptic-oblong, acute or acuminate, coriaceous, tough, silky hairy when young, afterwards glabrous, shining above, glaucous beneath, strongly sub-triplinerved at the base; lateral nerves 3-5 on either half; base narrowed to the petiole, which is 3-9 in. long. *Heads* 4-flowered, densely silky, in clusters about 1 in. across; bracts 4. *Flowers* yellowish, small; pedicels about 2 in. long. *Perianth* segments 4, villous outside. *Stamens* 6, glands of inner series stipitate. *Fruit* 5-6 in. long, ovoid-oblong, seated on the thickened pedicels.

**KHASI HILLS, (Griffith) MANIPUR, (8,000 ft.)**

Flrs. 2-3. Fr. Cold season.


A middle-sized small evergreen tree or a shrub. *Bark* brownish, lenticellate; young shoots pubescent. *Leaves* alternate, 3-6 by 5-1.2 in., oblong-elliptic, oblong-lanceolate, acute or acuminate, thinly coriaceous, glabrous above when mature, glaucous beneath with a white bloom, obscurely sub-triplinerved at the base; lateral nerves 2-4 on either half, slender; petiole 5-1.5 in. long; heads yellowish, white in dense sessile clusters; pedicels about 1 in. long. *Perianth* segments 4, villous without. *Stamens* 6, glands sessile. *Fruit* 3 in. across, 4-5 in. long, oblong-ovoid, purplish, ultimately blackish; pedicels elongated, 5-7 in. long.

**MANIPUR, KHASI HILLS, (4,000 ft.).**
(In Khasi Hills specimens, the berries are much smaller than described above).

Flrs. 3-5. Fr. 9-11.


A shrub; stem greyish; branches slender; young shoots, silky pubescent. *Leaves* alternate, scattered, 1.5-3.2 by 5-9 in., elliptic or elliptic-lanceolate, caudate-acuminate, coriaceous, glabrous, shining above, glaucous beneath,
punctate on both surfaces, sub-triplinerved at the base; lateral nerves 2-3 on either half, rather obscure; base acute; petiole 5-3 in. long. Male heads 15 in. across in dense sessile clusters; bracts concave, membranous, sparsely puberulous without. Fruit clustered on a very short peduncle (almost sessile), globose, about 0.08 in. across, mucronate, seated on the lobed perianth pedicel, 1-2 in. long pubescent.

KHASI HILLS, (4,500-5,000 ft.).

Frs. 10. Fr. 7.

11. NEOLITSEA Merr.

Evergreen trees. Leaves strongly tripli- or sub-triplinerved; buds perulate. Flowers dioecious; umbellules 3-7 flowered, in clusters or short racemes; involucral bracts 4. Stamens in male flowers 6 (fertile) those of the 2 outer rows eglandular, those of the 2 inner bi-glandular; anther-cells all introrse or the lower lateral, staminodes in female flower usually linear or linear-clavate. Ovary ovoid; style thick; stigma peltate, (in male flower 0 or small pistillode). Berry globose or ellipsoid, seated on the somewhat enlarged perianth tube and slightly elongated pedicel; pericarp smooth; cotyledons hemispheric.

Neolitsea zeylanica Merr. n. Comb.

A middle sized or small tree. Bark greyish-brown, warty, fairly plain, 2 in. thick; inside yellowish, fairly mottled, turning black on exposure; young shoots silky. Leaves 3-6 by 1.4-2 in., elliptic or elliptic-lanceolate, acuminate, coriaceous, glabrous, strongly sub-triplinerved at the base; lateral nerves 2-4 on either half; gradually becoming obscure towards the apex; nerves impressed above, raised and prominent beneath; base cuneate; petiole 5-1.2 in. long. Heads 4-5-flowered in almost sessile clusters; perianth silky; segments 4-5. Fruit ovoid-oblong, 3-4 in. across; perianth tube small, obscurely cuneate, 1 in. across; pedicel elongated in fruit.

SYLHET, MANIPUR, KHASI & JAINTIA HILLS, (5,200 ft.).

Frs. 11. Fr. 4.
Lindera. \[115. LAURACEÆ.\]


A middle-sized or large tree; bud scale and bracts silky, otherwise glabrous. \textit{Bark} dark-brown, with vertical lines of small warts, otherwise plain, faintly aromatic, \(\cdot 1-\cdot 12\) in. thick; inside dark-brown, turning chocolate, fibrous. \textit{Leaves} 3-7 by \(1\cdot 25-2\cdot 5\) in., elliptic-accuminate, rigidly coriaceous, glabrous, sub-triplinerved at the base; lateral nerves small, 2-3 on either half; base cuneate or acute; petiole \(\cdot 5-\cdot 1\) in. long. \textit{Flower} heads (male) in shortly peduncled fascicles of 3-4.

Flrs. (male) 11.

\textbf{12. DODECADENIA} Nees.

\textit{Dodecadenia paniculata} Hk. \textit{f.}

A small evergreen tree, glabrous. \textit{Leaves} 2-7 by \(1\cdot 2\cdot 2\) in., elliptic-oblong, oblong or elliptic-ovate, entire, acute, obtuse or acuminate, coriaceous, glabrous, rather shining above; lateral nerves 8-12 on either half, impressed above, prominent beneath with elegant reticulation of tertiary nerves on the upper surface; base rounded or narrowed into the petiole \(\cdot 3-\cdot 7\) in. long. \textit{Flowers} bisexual, in sparsely pubescent axillary panicles (often from old stem); pedicels \(\cdot 2-\cdot 3\) in., rusty-pubescent. \textit{Perianth-tube} short; segments (6-9) oblong, subequal, spreading; filaments hairy, 1 and 2 lines biglandular, 3 and 4 lines biglandular. \textit{Stamens} 18; anthers 4-celled. \textit{Fruit} obovoid or clavate, 1-1\cdot 5 by \(\cdot 5-\cdot 6\) in., seated on the dilated thick flat perianth tube (pedicel thickened into the obconic calyx-tube).

MANIPUR, KHASI & JAINTIA HILLS, (Jowai, upto 5,500 ft.).

Flrs. 10. Fr. 1, (young).

\textbf{13. LINDERA} Thumb.

Shrubs or trees often deciduous. \textit{Leaves} alternate or sub-opposite, penni- or 3-5- nerved; buds covered with scales or naked. \textit{Flowers} usually dioecious, pedicelled, in heads or umbels, which are enclosed in an involucre of 2-5 bracts, sessile or stalked, fascicled or racemously arranged. \textit{Perianth-tube} very short; segments 7-9, sub-equal, small, petaloid.
Male flower: stamens 9, usually 3-seriate; filaments narrow, first and second series eglandular, third 2-glandular; anthers 2-celled, all introrse. Fruit globose or ovoid, seated on the unaltered or disciform, entire or 6-toothed perianth tube.

Leaves persistent:—
  Leaves penni-nerved:—
    Umbels pedunculate:—
      Bracts 4. Stamens 9:—
        Flowers 10-15 in each head:—
          Lateral nerves 6-10:—
            Branchlets and inflorescence rusty or tawny-pubescent.
            ... 1. L. assamica.
        Flowers 9 in each head:—
          Lateral nerves 5-8:—
            Branchlets and inflorescence glabrous.
            ... ... 2. L. Meissneri.
      Flowers 10-12 in each head:—
        Lateral nerves 8-12:—
          Branchlets and inflorescence densely tomentose.
          ... ... 3. L. latifolia.

Umbels sessile or sub-sessile:—
  Umbels 4-9-flowered:—
    Bracts 4:—
      Leaves 6-9 in. long.
      ... 4. L. reticulata.
  Umbels 6-10-flowered:—
    Bracts 5-8, imbricate:—
      Leaves 1-5-6 in. long.
      ... 5. L. bifaria.

Leaves triplinerved at base:—
  Leaves obtusely short-acuminate:—
    Leaves thinly coriaceous, glaucous beneath, 2-5-4 in. long:—
      Ovary glabrous. Fruit globose.
      ... 6. L. caudata
    Leaves thinly coriaceous, not glaucous beneath, 3-5 in. long:—
      Ovary pubescent. Fruit ellipsoid.
      ... 7. L. pulcherrima.
  Leaves obtusely short-acuminate:—
    Leaves coriaceous, not glaucous beneath, 2-3 in. long:—
      Bracts 4. Fruit ellipsoid.
      ... 8. L. melastomaceae.

Leaves deciduous:—
  Leaves 3-7 nerved at the base:—
    Bracts 4. Fruit globose:—
      Leaves 2-6 in. long.
      ... 9. L. Neesiana.
1. **Lindera assamica** *Kurz.* Vern *Matabhe* or *Bambhe*, Ass.; *Dieng-pakhar*, Kh.

A small tree or shrub; young shoots, tawny silky-pubescent. *Leaves* 3-6·5 by 1-1·8 in., lanceolate or elliptic-lanceolate, acuminate or caudate-acuminate; glabrous and shining above, minutely hairy specially along the nerves, coriaceous, penni-nerved; lateral nerves 6-10 on either side, joined by sub-parallel cross-nerves; base cuneate or acute; petiole 25-5 in. long. *Flowers* 10-15 in each head on common peduncle 4·1 in. long, which are arranged in racemes or are sometimes solitary, fascicled; bracts glabrous, broad, concave, about 25-3 in. long. *Perianth* segments 6, sub-equal, more or less silky outside, lanceolate; pedicels silky, about 15 in. long. *Male-umbels* 25 in. across; filaments hairy. *Female-umbels* smaller with shorter puduncles and shorter pedicelled flowers. *Fruit* sub-globose, about 3 in. long.

LAKHIMPUR, KHASI HILLS, (Umsaw).

Frs. 2-5. Fr. 6.

2. **Lindera Meissneri** *King et Hk.* f.

A small tree or shrub. *Leaves* 2-3 in. long, ovate or ovate-lanceolate, caudate-acuminate, chartaceous, quite glabrous; lateral nerves slender, 5-8 on either half. *Heads* silky, 9-flowered; bracts membranous.

MIKIR HILLS, NUKU HILLS, (Simmons) ASSAM, (Brandis, 540, F.B.I. V., p. 182).

A closely allied plant supposed to differ from the preceding species mainly by the glabrous branchlets and chartaceous leaves, the latter with 5-8 pairs of secondary-nerved flowers 9 in each "head. The sheets under this name appear to me to belong to the species described above. I have not seen Simmons' sheets from Nuku Hills.


A moderate-sized tree. *Bark* grey, warty; blaze reddish or yellowish-brown; branchlets, undersurface of leaves and inflorescence grey tawny-tomentose. *Leaves* 5-8 by 2·2-4·5 in., obovate, broadly ob lanceolate or elliptic, acuminate to
sub-acute, thin; lateral nerves 8-12 on either side, impressed above, prominent beneath, joined by conspicuous sub-parallel tertiaries; petiole .25-.5 in. long. Umbels about .25 in. across, 10-12 flowered on rather stout peduncles, .3-.5 in. long; peduncles solitary, clustered or fascicled on short protuberances; pedicels 2 in. long, pubescent; bracts .4 in., pubescent. Filaments hairy. Fruit globose, .25 in. across, turning brown to dark chocolate on ripening.

Khasi Hills, 4,500-6,000 ft.

Ffr. 2-4. Fr. 7-10.


A small or moderate sized tree. Bark brown or greyish-brown, exfoliating in irregular pieces, somewhat rough; blaze yellowish-brown turning darker on exposure; branchlets and undersurface of leaves rusty-tomentose. Leaves 6-9 by 1·8-3·2 in., obovate-oblong or oblanceolate-oblong, obtuse or acute; lateral nerves 10-15 on either side, prominent beneath with conspicuous cross nervules; petiole .4-.6 in. long, stout, tomentose. Umbels .15 in. across, clustered, sessile or very shortly stalked, 4-9-flowered; bracts 4. Perianth segments unequal. Stamens 6-12; filaments villous, almost all with stipitate glands. Fruit about .5 in. long, ellipsoid or oblong, smooth, shortly pedicelled.

Khasi Hills about 3,000 ft., Sibsagar (Sheet 3027), Lakhimpur (455 M.), Goalpara (Wallich), Sylhet (De Silva).

Ffr. 4.

5. Lindera bifaria Benth.

A small tree or a large shrub. Bark greyish white, thin, very variable as regards hairiness; branchlets nearly glabrous to brown-villous; young shoots densely silky, villous; buds covered with imbricate silky tomentose scales, glabrescent with age. Leaves very variable, 1·5-6 by .8-2 in., elliptic
or ovate, lanceolate, acuminate, coriaceous, more or less pubescent along the midrib, specially towards the base, otherwise glabrous above, pubescent to brown-villous beneath; lateral nerves 5-10, prominent beneath; tertiaries faint or strong; petiole about 0.25 in. long, stout. *Umbels* sessile, solitary or clustered, globose, upto 0.15 in. across in bud, 3-4 in. across when open, 6-10-flowered; bracts 6-8, imbricate, rounded, coriaceous, concave, more or less pubescent, about 0.25 in. long. *Flowers* very small; pedicels short, tomentose. *Perianth* tube tomentose outside; segments 6, glabrate, unequal. *Stamens* 9; filaments glabrous. *Ovary* glabrous. *Fruit* 0.25 in. across, globose, seated on the small shallow cup-shaped perianth tube.

*KHASI & JAINTIA HILLS* (upto 4,000 ft.), *SIBSAGAR*, NAGA HILLS, Kohima, (5,000 Watt.).


A moderate sized or a small branchy tree. *Bark* dark-grey or brown, nearly smooth; blaze light, often yellowish-brown; young shoots fulvous or rusty silky-pubescent or tomentose; branchlets slender. *Leaves* 2.5-4 by 1.1-1.5 in., ovate to elliptic-lanceolate, caudate-acuminate, thinly coriaceous, glabrous above, glaucous beneath; base 3-nerved; nerves running upto the apex and joined by prominent sub-parallel tertiaries; petiole 3-5 in. long. *Flowers* about 0.08 in. across, rather spicate, each flower in the axils of a bract and with 2-concave pubescent bracteoles. *Perianth* villous on both surfaces; segments 6, subequal. *Stamens* 9, villous, 3 inner 2-glandular; in female flowers 6 staminodes each with 2 large glands. *Ovary* glabrous with large discoid stigma. *Fruit* globose, about 0.25 in. across, speckled yellow and shining when ripe, seated on the 6-cleft perianth tube.

*KHASI HILLS* 4-5,500 ft.
The wood is cream coloured.


A large tree (according to F.B.I. & Brandis), but a small tree judging from specimens observed hitherto in Assam; branchlets pubescent, soon glabrate; buds and new shoots at first silky-villous. *Leaves* 3-5 by 7-1.7 in., elliptic-ovate to lanceolate or oblong-lanceolate, caudate-acuminate, thinly coriaceous, pale and often glaucous beneath (acumen often about 1 in. long); base 3-nerved; nerves meeting near the apex, usually raised on both surfaces; petiole slender, 3-7 in. long. *Umbels* 4-6 or sometimes fewer-flowered, in sessile cluster in leaf-axils, enclosed in 4-6 large imbricating concave more or less pubescent deciduous unequal bracts; pedicels silky-tomentose, 25 in. long. *Perianth* about 15 in. across, pubescent, nearly or wholly deciduous in fruit; segments 6, sub-equal, oblong. *Stamens* 9, short, nearly glabrous or pubescent. *Ovary* and style pubescent; stigma large. *Fruit* about 3 in. long, ellipsoid, on enlarged pedicels which are 3-6 in. long.

KHASI HILLS 5-6,000 ft.

Flrs. 3-4. Fr. 10-11.


A small tree often only a shrub with stiff erect branches. *Bark* dark yellowish-brown, warty; blaze dull white, irregularly speckled with coarse strands of brown tissue, green underneath the corky layers. *Leaves* ascending, 2-3 by 5-1.3 in., obovate, oblanceolate or elliptic-oblong, obtusely short-acuminate, entirely glabrous, green beneath; base with 3 strong nerves, usually raised on both surfaces joined by strong sub-parallel tertiaries, narrowed into the very short petiole, which is 15-3 in. long. *Umbels* 3-5-flowered, sessile or nearly so; peduncle when present very short; bracts 4, coriaceous, glabrous or nearly so, orbicular, concave; pedicels silky-villous, 1-15 in. long. *Perianth* villous within; segments 6. *Stamens* 9; filaments hairy, inner 3, 2-glandular. *Fruit* 3 in. long, ellipsoid, slightly apiculate,
seated on the entire or more or less broken up perianth tube; fruiting pedicel \( \cdot 3 \cdot 5 \) in. long.

KHASI HILLS 3-4,500 ft.

Flrs. 2-3. Fr. 9-11.


A middle sized tree, aromatic, glabrous. *Leaves* 2-6 by \( \cdot 8 \cdot 1 \cdot 8 \) in., ovate-oblong, lanceolate, rarely sub-orbicular, usually acuminate, entire, membranous, glabrous; lateral nerves 4-6 on either half, slender, angular; base obtuse, rounded or cuneate, slightly oblique; irregularly 3-nerved; petiole slender, \( \cdot 3 \cdot 9 \) in. long. *Heads* 5-8-flowered, solitary or clustered (3-6 together), globose, \( \cdot 2 \cdot 3 \) in across, (before opening); bracts 4, membranous. *Perianth* segments almost orbicular, membranous, almost glabrous. *Stamens* 9; filaments, inner biglandular. *Fruit* globose, \( \cdot 1 \) in. across, seated on the 6-lobed perianth.

MISHMI HILLS (Griffith) (F.B.I. Vol. V. P. 186, Brandis Indian Trees P. 541). No specimen in Forest Herbarium, Shillong.

Flrs. 1-11.

L. *Griffithii* Meissn.

An imperfectly known small tree or large shrub; young shoots silky. *Leaves* 2-5-4.5 by 1-1.7 in., lanceolate or elliptic-lanceolate, acuminate, glabrous above, glabrate or nearly so beneath, penninerved; lateral nerves 6-8, slender, about \( \cdot 25 \) in. long. *Umbels* upto 12-flowered, peduncled; peduncles about \( \cdot 3 \) in. long, solitary or fascicled in leaf axils; pedicels about \( \cdot 15 \) in. long, silky villous. *Perianth* segments elliptic, thinly silky along the back. *Male* flowers not seen. *Ovary* glabrous. *Fruit* not seen.

LAKHIMPUR, (Sheet No. 3393, U. N. Kanjilal).

Flrs. 2.

14. PURKAYASTHÆA Purkayastha ex Narayanswami, gen nov.

Purkayasthæa *pseudomicropora* Purkayastha ex Narayanswami sp. nov. Vern. Bonhingalo, Ass.

An evergreen middle-sized tree attaining a height of 66'-70' and girth of about 7' with a spreading crown. *Bark* whitish grey, reddish inside. *Branchlets* marked with the
scar of fallen leaves. Young shoots, buds and petioles of
the leaves rusty-pubescent. Leaves simple, alternate, crowded
upwards on the ends of branchlets, 10-13 by 4-7 in., obovate,
apiculate, rarely rounded or retuse, cuneate, entire, rusty-
pubescent along the midrib on the upper surface otherwise
glabrous, undersurface rusty-pubescent, chartaceous; midrib
prominent beneath, marked by a shallow depression above;
lateral nerves 13-16, prominent beneath, directed upwards
and connected by equally distinct intermediate veins. Petiole
stout, channelled above, ·4 in. long. Inflorescence
in axillary lax panicles; rachis 5-8 in. in length, rusty-
tomentose; flowers hermaphrodite, small, about ·1 in. long
and ·1 in. across, campanulate; pedicel about the same
length as the flower, slightly dilated under the flower,
tomentose. Perianth tube about ·05 in., coriaceous, pubescent
outside and villous inside; lobes 6, imbricate, about as
long as the tube, elliptic-obovate, pubescent outside and
villous inside. Fertile stamens 6, inserted on the perianth
lobes and opposite to them, included; filaments very short,
about half the length of the anthers, pubescent, flat; anthers
introrose, short and thick, about ·05 in. long, 2-celled, opening
upwards from the base by valves; valves persistent. Staminodes
in two rows of 6, the innermost row ovate in
outline and villous, ·06 in long, opposite the stamens and
closely adpressed to the glabrous ovary; the second row
 glandular, alternating with the stamens, often attacked by
larvae of insects. Ovary about ·05 in. long, glabrous, ovoid,
one-celled and one-ovuled. Style ·05 in. long, subulate.
Fruit drupaceous with a hard rugose pericarp 1-1·5 by
·8-1 in., obovate-elliptic in outline.

ASSAM: Digboi Res—LAKHIMPUR DICTRICT, 300-500 ft.

Flrs. 8-9. Ripe fruit one year after flowering.

The specimen could not be matched either at Kew or Sibpur
Royal Botanic Garden. When I first scrutinized the specimen I
thought it might be a new species under the genus Micropora as
described in Hooker's Icones Plantarum t. 1547 (1886), but while I
was finally describing the plant Mr. Narayanaswami of the Botanical
Survey of India, officiating Curator Royal Botanic Garden, Sibpur,
suggested that it should be described as a new genus because it
could not be included under *Micropora* which derives its name from the fact that the anthers dehisce by minute pores, whereas in this case they open by two valves.—Purkayastha.

(Indian Forester, May 1938).

15. **CASSYTHA** Linn.


A filiform leafless twining parasite, attaching itself by haustoria to the host plant. *Stem* dull-green, puberulous when young, glabrescent with age. *Leaves* none, or reduced to few minute hyaline scales. *Flowers* bisexual, white, minute, 1 in. long when fully formed, in few-flowered lax spikes, from the axils of leaf scales, which are upto 3 in. long. *Bracteoles* 3, connate at the base, broad-ovate, ciliate. *Perianth* lobes 6, in two series; outer smaller, free, nearly to the base, broad-ovate, concave, edges hyaline and ciliate; inner white, valvate, much exceeding the outer, free to more than half the length, concave, oblong, glabrous. *Stamens* in whorls of 3; outermost petaloid, introrse, eglandular; second series sterile and eglandular; third series extrorse and 2-glandular at the base; fourth series reduced to yellow staminodes. *Ovary* free, globose, 1-celled; style subulate. *Fruit* 2 in. across invested by the persistent perianth.

SYLHET, (F.B.I., V., p. 188).

*Flrs.* & *Fr.* almost throughout the season.
FAM. 116. HERNANDIACEÆ.

(Engler U. Prantl. iii. 2. 126).

Climbing shrubs or large trees. Leaves alternate, exstipulate, pinnate or simple, entire or lobed. Flowers 2-sexual or monœcious, regular in cymes or panicles. Perianth free or shortly united below in two valved 3-5-merous whorls or in one imbricate, 4-8-merous whorl, rarely 2-partite. Stamens 3-5 in one whorl, opposite the outer perianth segments, sometimes alternating with glands or staminodes; anthers opening by valves. Ovary inferior, 1-celled; ovule solitary, pendulous, anatropous. Fruit dry, indehiscent, sometimes winged. Seeds exalbùminous.

ILLIGERA Blume.

This genus had been included under Combretaceæ by Bentham and Hooker in Genera Plantarum. The present arrangement follows that of Engler and Prantl. Pflanzenfamilien, III. 2. 126.

Scandent shrubs. Leaves alternate 3 (or 5)-foliolate. Leaflets petiolulate. Flowers 2-sexual, in lax cymes, bracteolate. Calyx-tube constricted above the ovary; segments 5, patent. Petals 5, oblong. Stamens 5, epigynous with 2-hooded scales at the base of filaments; anthers valved laterally. Ovary 1-celled; ovules solitary, pendulous; style filiform; stigma peltate, undulate. Fruit 2-4-winged. Seeds oblong; cotyledons plano-convex; radicle included.

Fruit 2-winged:

Fruit up to 3 in., broad (including wings):

Inflorescence cymose panicles:

Sepals 16 in. long:

Wings oblong or ovate. . . . 1. I. appendiculata.

Fruit 3-3.5 in., broad:

Inflorescence elongated cymes:

Sepals 25 in. long:

Wings orbicular or sub-orbicular. . . 2. I. khasiana.
Fruit 2-4-winged, frequently 3:
Inflorescence corymbs. . . . . . . . . . . . . . 3. *I. villosa*.

1. *Illigera appendiculata* Blume.

An extensive climber (40-80 ft. tall); young parts tawny-pubescent, soon becoming glabrous. *Leaves* trifoliolate; common petiole 3-4 in. long. *Leaflets* 2-5 by 1·5-·5 in., variable in shape, elliptic, oblong-ovate or sub-rotund, entire, acute, obtuse or abruptly short, acuminate, sub-coriaceous or membranous, glabrous above, pubescent along the nerves beneath; secondary nerves 3-5 on either half, prominent beneath; base rounded or truncatR or shallow-cordate, often unequal sided; petiolules .3-.9 in. long. *Flowers* in pendulous lax cymose panicles, '2-·3 in. across; pedicels pubescent. *Calyx* puberulous; segments '16 in. long. *Petals* lanceolate. *Stamens* curved inwards. *Fruit* sparsely tomentose, 4-angled, 2-3 by 8·1·2 in. (including the wings)

ASSAM, KHASI HILLS.

Frs. 8-11. Fr. 9-1.

Mr. S. T. Dunn in his revision (p. 294, Vol. 38, 1908 Journal of the Linnean Society) mentions that true *I. appendiculata* is a plant with ovate leaves and hairy in the axils of the veins beneath. I examined such specimens (vide Burma No. 11573 Mang P.O. Khant, Mytkyina, Burma and Andamans. Parkinson's 241 of 1915 & 22 of 1913, Forest Research Institute Herbarium), but could not however follow Dunn's revision in separating *I. appendiculata* & *I. trifoliata*.


A large climber spreading to the tops of tall trees; branchlets striate. *Leaves* 3-foliolate; petiole 2-5 in. long, sometimes coiling like tendrils round supports; leaflets 3-6 by 1-2·7 in., elliptic-lanceolate or oblanceolate or elliptic-ovate, acuminate, narrowed, rounded or cordate and often unequal at the base, thinly coriaceous, minutely punctate, glabrous except for tufts of yellowish hairs on nerves axils beneath; lateral nerves 4-5 on either half, arcuate; petioles .25-1 in. long. *Flowers* bisexual, .4-·6 in. long, in lax peduncled pubescent cymes. *Cymes*
compound, arranged on terminal and axillary panicles, 4-10 in. long; pedicels tomentose, ·15 in. long with a solitary small ovate or elliptic bracteole at the base. *Perianth* dull-reddish brown, of two whorls of 5 segments each; segments connate in a constricted tube above the inferior ovary, oblong-lanceolate, acuminate, ·3-·4 in. long; outer thinly pubescent or puberulous; inner-segments somewhat smaller, villous or densely grey pubescent and each often subtending a minute gland. *Stamens* 5, epigynous; filaments glandular, puberulous, each with 2 white staminodes on each side near the base which are obovate-oblong in outline, clawed, emarginate and excavate at the apex. *Ovary* brownish-tomentose; style 1, filiform, ending in a dilated undulate stigma. *Fruit* 1·4-2 by ·3-·5 in., 2-winged with a sharp longitudinal ridge on either face, wings brown, rounded, nearly glabrous with horizontal striations.

LAKHIMPUR, SIBSAGAR, KHASI & JAINTIA HILLS, 2-3,000 ft. LUSHAI HILLS, MIKIR HILLS.

Flrs. 10. Fr. 1-2.

3. *Illigera villosa* C. B. Clarke.

Branches fulvous-villous. *Petiole* upto 3·5 in. long. *Leaflets* upto 4·7 in. long and 2·6 in. wide, elliptic-acute, sparsely pilose beneath. *Inflorescence* supra-axillary, corymbose, 1 in. diameter; flowers pink; peduncle 1-1·7 in. long, pubescent as are the branches and short pedicels; bracteoles ovate-obtuse, ·05-·12 in. long, rather densely pubescent on both sides, ciliolate. *Calyx* campanulate, ·35-·4 in. long; tube short; lobes ovate-oblong, acute or obtuse, ·26-·34 in. long, ·11-·13 in. wide, sparingly setose without, ciliolate. *Petals* ovate-oblong, obtuse, ·24-·26 in. wide, puberulous on both sides, minutely ciliolate. *Staminodes* elliptic-oblong, obtuse, entire, concave, ·11 in. long, ·05 in. wide, narrowed at the base and almost stalked. *Stamens* ·17 in. long; filaments stout, papilllose-glandular as are the connectives; anthers ·1 in. long; pollen granular. *Ovary* more or less quadrangular, ·1-·15 in. long, densely hairy or setose; style slender, ·17 in. long, setose. *Fruit*
1.5-2 in. broad, almost glabrous, 2-4-winged, frequently 3-winged.

NAGA HILLS (Clarke's No. 41843) (Journal Society Vol. XXV (1890), p. 22); NAGA HILLS—Shipoketami, 1500 m., flrs. July, N. L. Bor 5091; Kohima, 1,500 m., flrs. May. N. L. Bor 6366; (Amplified, Kew Bulletin No. 5, 1938).

Creeper used as a febrifuge.

**FAM. 117. PROTEACEÆ.**

Trees or shrubs, rarely herbs. *Leaves* usually alternate, exstipulate, entire or much divided, commonly with a thick cuticle, coriaceous. *Flowers* usually hermaphrodite in racemes, spikes or heads and often very showy. *Perianth* corolline; segments 4, valvate in bud, bent or rolled back when open. *Stamens* 4, adnate, to the sepals; anther-cells 2-introrse, dehiscing longitudinally. *Disk* hypogynous, annular, glandular or of scales, often absent. *Ovary* superior, 1-celled, often oblique; style terminal, tip thickened; stigma terminal or lateral. *Ovules* solitary or 2 or many. *Fruit* various. *Seeds* exalbuminous; cotyledons often unequal; radicle short, inferior or lateral.

**HELICIA Lour.**


Racemes glabrous:—

Leaves petiolate; petiole 3-1 in. long:—

Fruit 1-1.5 in. across. ... 1. *H. erratica.*
Leaves sessile or nearly so; petiole 0.2 in. long;—
  Fruit apiculate, 1 in. across. .. 2. H. robusta.
Racemes (rachis) rusty-tomentose;—
  Fruit •5-7 in. across. .. 3. H. excelsa.


A small or middle sized evergreen tree, glabrous. Bark pale brownish, somewhat rough, •16 in. thick, granular; blaze 1st layer dark-brown with yellow vertical lines and inside light-brown with blackish fibrous strands. Leaves 2-8 by 1-2.5 in., obovate, ob lanceolate, elliptic-lanceolate, acute or obtuse, entire or coarsely serrate, coriaceous, glabrous, shining above (Leaves drying pale yellow); lateral nerves 6-9 on either half (intermediaries are more conspicuous); base cuneate; petiole •3-1 in. long. Flowers yellowish, slender, •7-8 in. long. Racemes 3-9 in long. Fruit oblique, globose, 1-1.5 in. across, often beaked by the persistent style. Seeds light-red.

Sylhet, K. & J. Hills, (upto 6,000 ft.).
Wood white.

Flrs. 4-6. Fr. 9-1.

2. Helicia robusta Wall.

A small tree, quite glabrous. Bark brownish and dimpled outside, •12 in. thick; inside with hard horny dark-brown radical plates generally alternating with broad medullary rays of the wood, the intervening tissue being reddish brown, •25 in. thick. Leaves 4-13 by 1.5-3 in., oblong-lanceolate, obovate or oblong, obtuse or bluntly acuminate, coarsely serrate (often sharply), coriaceous, glabrous; lateral nerves 7-13 on either half, prominent beneath; base narrowed, rounded or obtuse; petiole •0.2 in. long. Racemes 9-12 in. long, glabrous. Fruit oblique, globose, about 1 in. across, beaked, abruptly narrowed into a short stalk; the outer covering of the stone is of violet colour and the stone is divided into 3 parts inside.

Sibsagar, Garo Hills, K. & J. Hills, (3,000 ft.).
Flrs. 7. Fr. 11.

A medium-sized or large tree; young shoots tomentose, yellowish-brown. *Bark* greyish, warty but plain, 3 in. thick; inside grandular. *Leaves* 5-11 by 1-5-5 in., obovate or oblanceolate, acuminate, entire or coarsely serrate, coriaceous, glabrous; lateral nerves 7-10 on either half, impressed above, prominent beneath; base acute or cuneate; petiole 3-1-4 in. long. *Racemes* rusty-tomentose, nearly as long as the leaves. *Ovary* tomentose. *Fruit* subglobose, 5-7 in. across, smooth.

N. C. HILLS, KHASI HILLS, (5,000 ft.).

Flrs. Rainy season. Fr. Cold season. Ripe fruit often upto May.

**Grevillea robusta.** A. Cunningham. The silver oak.

A large handsome tree; young shoots rusty-tomentose. *Leaves* twice pinnatifid (fern-like) silvery beneath. *Flowers* orange coloured in unilateral racemes. *Follicle* coriaceous, 6-75 in. long; oblique.

Native of AUSTRALIA. Commonly cultivated throughout the province as an avenue tree (specially in tea gardens).

**Hakea acicularis** Knight=Hakea obliqua Lodd.

A xerophytic shrub with rigid woody branches. *Leaves* needle-like. *Fruit* woody, hard.

Native of AUSTRALIA. Cultivated in Shillong.

Flrs. 3.

**Banksia** (Australian honey-suckle) is also cultivated in gardens.
FAM. 118. THYMELEACEÆ.

Shrubs or trees, rarely herbs, with tough inner bark. Leaves alternate less often opposite, simple, entire. Flowers usually 2-sexual, axillary or terminal in heads, umbels, clusters, spikes or racemes. Perianth regular, 1-seriate, tubular or campanulate, 4-5 lobed; lobes imbricate in bud, often with 1-2 scales at the base. Stamens as many as or twice as many as the perianth lobes. Disk annular, cupular or of scales. Ovary superior, 1-, rarely 2 or more celled; style long or short; ovules solitary or one in each cell, pendulous from near the top of the cell. Fruit indehiscent and capsular.

Ovary 1-celled, 1-ovuled. Fruit indehiscent:—
Perianth lobes 4, perianth without scales:—
Style 0 or very short. Leaves alternate, glabrous or nearly so. . . .
Style present. Leaves alternate and opposite. . . .
Perianth lobes 5, perianth with scales above the stamens:—
Fruit with thick pericarp. . . . 3. Linostoma.

Ovary 2-celled, cells 1-ovuled; fruit capsular:—
Perianth campanulate, lobes 5; stamens 10. 4. Aquilaria.

1. DAPHNE Linn.

Shrubs or small trees. Leaves alternate, usually glabrous or nearly so and coriaceous when mature. Flowers in terminal or lateral, sessile or peduncled heads or clusters. Perianth tubular; lobes 4, spreading; scales 9. Stamens 8, in two series, subsessile; anthers dorsifixd. Ovary 1-celled; style 0 or very short; stigma capitate. Fruit indehiscent, coriaceous or fleshy; testa crustaceous.

Perianth sparingly silky; flower buds not enclosed by involucre-like bracts. . . . . . . 1. D. cannabina.
Perianth densely silky-pubescent; flower buds enclosed by involucral bracts. . . . . . . 2. D. involucrata.

A shrub attaining 8 ft.; bark tenacious; branchlets hairy towards the top. Leaves 2-5 by 0.5-1 in., lanceolate to narrow-lanceolate, bluntly acuminate or acute, entire; base often tapering to a short petiole, coriaceous, glabrous, dark green above, pale beneath; lateral nerves 6-8 on either side, slender, rather obscure in green leaves, lower acutely ascending from the midrib, sub-arcuate towards the top, few intermediate nerves between the main secondary nerves, tertiaries reticulate; petiole up to 0.3 in. long. Flowers pure white, pale yellow or purple outside, scented, crowded in terminal or lateral head-like clusters on very short peduncles; peduncles silky; bracts lanceolate or subulate, caducous, 0.2-0.5 in. long, leafy. Perianth corolline, cylindrical, tube 0.4-0.8 in. long, often bent, silky outside, lobes oblong to ovate-lanceolate, acute, often with a tuft of hairs at the tip, usually reflexed with age. Filaments very short. Ovary on a minute sub-truncate stipe which is narrowed towards the base; style very minute; stigma capitate. Fruit orange, black or scarlet when ripe, 0.3-0.5 in. long, ovoid or ellipsoid.

KHASI HILLS 5-6,000 ft.

Firs. & Fr. 8-12.

The species include several forms which differ from one another in the colouring of the perianth, length of the perianth tube and colour and shape of the fruit. As a rule varieties with purplish flowers have fruits which turn purple or nearly black on ripening. Similarly forms with pure white flowers sometimes produce black fruits although normally orange or red fruits are produced. Forms with scarlet red globose fruits also occur which are usually correlated with yellowish or white flowers never with purple flowers. It appears that we are either dealing with a very variable species or several hybrids, of which the parent forms are D. cannabina Wall. D. suriel Smith and Cave (Records of the Botanical Survey of India, Vol. VI, No. 2, pp. 49-54).


A shrub about 5-6 ft. high; branchlets with more or less tufted hairs towards the end. Leaves variable, 3-6 by 1-1.75 in., lanceolate to elliptic-lanceolate or obovate-lanceolate, acuminate; base acute or cuneate, often undulate, coriaceous, secondary nerves slender, impressed
above, 8-12 on either side, petiole 0 to 0.3 in. long. Flowers fragrant in short peduncled head-like clusters at the ends of branches or on short lateral shoots, creamy; peduncles densely hairy; bracts caducous, sericeous. Perianth-tube 0.5-0.7 in. long, silky outside; lobes deltoid, shorter than in the last species; anthers slightly exserted. Fruit sub-globose, ellipsoid or obovoid, fleshy, scarlet when ripe, about 0.5-0.7 in. long.

KHASI HILLS, Shillong Peak, Dumpep, etc., 5,500-6,000 ft.
This probably represents the high level form of the last species. It differs by its broader leaves, broader perianth lobes and large and more fleshy scarlet fruits. It has also a slightly different season of flowering and fruiting. There are some forms of the last species which appear to be intermediate in character between the two. It is, however, easily recognized in the field.

Flrs. & Fr. 8-12.


A shrub or sometimes a small tree. Branchlets glabrous except at the tips. Leaves 3-7 by 0.75-2 in., oblong-lanceolate to elliptic-lanceolate, acuminate; base narrowed, glabrous, thinly coriaceous; lateral nerves slender, many, 14-22 pairs, arching; petiole 0.15-0.25 in. long. Flowers scented, white tinged with pink in few or many flowered peduncled heads, enclosed when young in two imbricating concave involucral bracts; peduncles 0.15-1.25 in. long, slender, more or less villous, solitary or fascicled, sometimes borne on slender axillary branches, involucral bracts obtuse, silky, 0.25-0.35 in. long. Perianth-tube 0.4-0.6 in. long, silky-villous; lobes 0.15-2 in. long, ovate-acuminate, upper series of anthers near the throat; style minute. Drupe black when ripe, ellipsoid.

KHASI & JAIN'TIA HILLS, 4-6,000 ft., N. CACHAR HILLS, Hotspring, MIKIR HILLS, Jortokhi.


Sheet No. 17467 (Naga Hills) appears to be different, but allied to D. cannabina Wall.

D. papyracea Wallich. has since been found in K. & J. HILLS —R. N. De.

Edgeworthia Gardneri Meissn.

A large shrub; branches long, scrambling. Leaves 3-5 by 1-2 in., oblong-elliptic or elliptic-lanceolate, acute or acuminate, glabrous above,
somewhat pilose beneath; base acute; petiole 2-3 in. long. **Peduncles** simple, 5-1.5 in. long, ebracteate. **Flowers** yellow in dense hemispherical heads. **Perianth** sub-villose, tomentose; lobes ovate, obtuse, 4. **Stamens** 8, biseriate. **Receptacle** tubercular, silky. **Ovary** villose. **Fruit** included in the base of the perianth; pericarp coriaceous; testa crustaceous.

**MISHMI HILLS, MANIPUR,** upto 7,000 ft.  
Frs. 12-6. Fr. 6-9.

### 2. **WIKSTROEMIA** Endl.


An erect deciduous shrub with few slender branches; young shoots villous. **Leaves** sub-opposite or alternate, 7-2 by 3-7 in., lanceolate to elliptic-oblong, acute, membranous, glabrescent above, more or less silky-pubescent beneath, specially along the midrib; main lateral nerves 5-7 on either side; petiole 1 in. long, hairy. **Flowers** yellow, subsessile, in few flowered heads or spikes. **Perianth** sub-persistent, tube slender, 25-35 in. long, silky outside; lobes 4, short, spreading, obtuse. **Disk** scales 4, linear. **Stamens** 8 in two series, one above the other. **Ovary** villous; style short; stigma large, globose. **Fruit** 2-25 in. long, narrowly ovoid, silky, black when ripe.

**KHASI HILLS,** 5,500-6,000 ft.  
Frs. 5-7. Fr. 9-10.

### 3. **LINOSTOMA** Wall.

**Linostoma decandrum** Wall. Vern. **Bakalbih,** Ass.; **Ruteng,** Kuki.

A climbing shrub; branchlets lenticellate. **Leaves**, opposite or sub-opposite, 2.3-7 by 75-1.2 in., oblong-lanceolate or elliptic-oblong, acuminate, sometimes shortly caudate, glabrous; lateral nerves numerous, subparallel; petiole 15-25 in. long. **Flowers** 2-sexual, greenish white in umbellate 6-10 flowered cymes on long peduncles; peduncles upto about 2 in. long, with 2 bracts which ultimately become enlarged and membranous, sessile, oblong or ovate-oblong, ultimate size 1-1.5 by 6-75 in.; pedicels 2-3 in.
long, jointed. Perianth tube glabrous, 2-3 in. long, ovoid; lobes 5, oblong, about as long as the tube, spreading, throat hairy; scales above the stamens 10, erect, clavate, 15 in. long. Stamens 10; filaments filiform, exserted. Disk 0. Ovary sessile, 1-celled; style filiform. Fruit 35-5 in. long, broadly ellipsoid, base acute, narrowed above, silky-villous towards the base, seated on the base of the perianth tube.

SIBSAGAR, SYLHET, CACHAR.

Frs. 11. Fr. 1.

4. AQUILARIA Lamk.


A large evergreen tree; young shoots silky. Leaves alternate, 2-4.5 by 8-2 in., oblong-lanceolate, elliptic to obovate-lanceolate, caudate-acuminate, glabrous or nearly so; base acute; lateral nerves numerous and faint; petiole 1-2 in. long. Flowers white, 2-sexual in terminal umbellate cymes which are sub-sessile or shortly peduncled; inflorescence silky; pedicels 2-3 in. long, slender. Perianth persistent in fruit, campanulate, 25-3 in. long, silky without, densely villous within, lobes 5, spreading, about as long as the tube, rounded; scales above the stamens 5, densely villous, connate at the base. Stamens 10; anthers 10, subsessile. Disk 0. Ovary subsessile, villous, 2-celled; stigma large, subsessile. Fruit capsular, 1-5-2 in. long, obovoid; pericarp coriaceous, densely tomentose.

NOWGONG, CACHAR, SIBSAGAR, KHASI HILLS upto 3,000 ft. Also found in DARRANG, KAMRUP and SYLHET.—R. N. De.

Frs. 6. Fr. 8.

"In the wood of the stem and larger branches are frequently found irregular masses of harder, dark coloured, highly scented wood (the Eagle-wood of commerce) used as incense, commanding a high price. The bast, when prepared, resembles parchment and was used by the old Kings of Assam to write on."—Brandis.

Used in India as a perfume and a drug. Also as incense.—R. N. De.
Aquilaria khasiana Hallier (in Meded Herb. Leid., No. 44, 18 (1922)).

An evergreen shrub or a small tree; young parts silky; branches terete, irregularly rugulose, somewhat rough. *Leaves* attenuate, shortly petioled, 4-6·6 by 1·2-2·2 in., oblong or obovate-lanceolate, sub-cuspidate-acuminate, revolute, glabrous except the nerves beneath, darkish green above, palish green beneath; base acute; lateral nerves close, parallel, irregularly anastomosed; petiole ribbed underneath, 17-25 in. long. *Flowers* in subsessile terminal or extra-axillary pubescent fascicles. *Calyx* lobes 4 or 5, pubescent outside, greyish tomentose inside, 12 in. long; tube 27-31 in. long. *Anthers* sessile, introrsely bi-locular. *Capsule* 1·3 in. long, about 5 in. broad, stipitate, ovately sub-rhomboid, glabrous, darkish, loculicidal. *Seed* rostrate.

KHASI HILLS, 3.000 ft.

Flrs. 5-6. Fr. 7-10.

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FAM. 119. ELÆAGNACEÆ.

Trees or shrubs covered with silvery or brown, often stellate and peltate scales, sometimes with stellate hairs, sometimes with thorn (short, reduced). *Leaves* alternate or opposite, exstipulate, entire. *Flowers* small, 1-2 sexual, white or yellow in axillary fascicles or cymes. *Perianth* tubular, 2-4 cleft (in bisexual and female flowers) the lower portion persistent, often accrescent in fruit; in male flowers perianth reduced to 2-4 lobed limb. *Stamens* in bisexual flowers adnate to the throat of the perianth tube and as many as the segments, in female flowers adnate to the perianth base and twice as many as the segments; filaments free; anthers 2-celled. *Ovary* 1-celled, free; style filiform; stigma lateral; ovule 1, basal, erect, anatropous. *Fruit*
indehiscent, a pseudo-drupe closely invested by the accrescent base of the perianth tube. *Seeds* exalbuminous; embryo straight; radicle inferior.

1. **ELÆGNUS** Linn.

Shrubs or small trees, sometimes thorny. *Flowers* solitary or fascicled. *Perianth* tube constricted above the ovary; segments 4 (rarely 6), valvate, deciduous. *Stamens* 4 on the mouth of the perianth tube, alternating with the segments. *Style* linear, included; stigma lateral. *Fruit* with coriaceous or crustaceous endocarp. *Seed* with hard shining testa.

Endocarp ribbed, densely hairy within:—
Fruit 3 in. long:—
   A deciduous shrub. .. .. 1. *E. umbellata*.
Fruit about 1 in. long:—
   An evergreen shrub. .. .. 2. *E. latifolia*.
Endocarp not ribbed, glabrous within:—
Fruit 2-3 in. long, pyriform. .. .. 3. *E. pyriformis*.

1. **Elæagnus umbellata** Thunb.

A much branched thorny deciduous shrub, often forming a dense bush; young shoots clothed with silvery scales. *Leaves* 1-3 by 3-1 in., elliptic-oblong or elliptic-lanceolate, acute or acuminate, undulate, subcoriaceous, stellately hairy above when young, glabrate in maturity, clothed with bright silvery scales beneath; lateral nerves obscure; base rounded or narrowed; petiole 2-3 in. long. *Flowers* fragrant, dull white, silvery outside, appearing with the leaves in small axillary clusters. *Perianth* 2-4 in., constricted above the ovary; segments triangular-ovate; style included. *Fruit* 3 in. long, oblong-ovoid, succulent, covered with silvery scales; endocarp ribbed, coriaceous.

MANIPUR (Brandis).
The fruit is eaten.

Flrs. 4-6. Fr. Rainy season.

2. **Elæagnus latifolia** Linn. Vern. Soh-sang, Soh-khlar, Soh-chhang, Mi-soh-sang, Dieng-soh-sang, Mei-shong-
Elæagnus.] 120. LORANTHACEÆ. 115

klor-tyrneng, Kh.; Dieng-soh-sylangi, Synt.; Birai-asing, Miri; Solengi-arikong, The-tumda-awrong, Mik.; Chhokhua, Garo; Loh-baroi, Sylh.; Mirica-tenga, Bon-jara, Ass.

A large woody evergreen straggling or scandent shrub, often spiny. Bark blackish-grey, rough, often with raised lenticels ~3 in. thick; blaze light red, turning brownish, fibrous. Branchlets densely crowded with ferruginous scales. Leaves alternate, very variable, usually 2-6 by 1-3 in., ovate-oblong or elliptic, acute or acuminate, entire or slightly undulate, subcoriaceous, glabrescent above, clothed beneath with silvery or ferruginous scales; lateral nerves 6-8 on either half; base rounded or acute; petiole ~3-~5 in. long, channelled. Flowers often peduncled, ~5 in. long, ~2 in. across, scented few or dense in axillary fascicles. Perianth clothed outside usually with circular ferruginous scale; tube ~15-~25 in. long; pedicels elongated in fruit. Fruit 1-1.5 in. long, ovoid, oblong, 8-ribbed, red or yellow when ripe, succulent; endocarp coriaceous, silky inside.

N. E. FRONTIER TRACT, LAKHIMPUR, SIBSAGAR, KAMRUP, GARO HILLS, CACHAR, SYLHET, KHASI & JAINTIA HILLS.

Fruits are edible when ripe.

Frs. 11-2. Fr. 4-5.


A scandent or straggling woody shrub. Bark darkish grey, splitting vertically, ~3 in. thick; blaze first layer dark-brown and inside red fibrous; young branches densely covered with brown scales. Leaves 1.5 by ~5-3 in., elliptic or elliptic-oblong, acuminate, entire or slightly undulate, coriaceous, glabrous above, clothed with pale scattered silvery scale beneath. Flowers ~4-~5 in. long, covered outside with coppery scales, in short axillary clusters; buds club-shaped; pedicel short, ~1-~15 in. long. Fruit pyriform, ~3-~4 in. long, yellowish when ripe, covered with coppery scales; endocarp crustaceous, not ribbed, glabrous.
MISHMI HILLS, LAKHIMPUR, KAMRUP, GOALPARA, KHASI & JAINTIA HILLS (5,000 ft.).
Ripe fruit is eaten.

Frs. 11-1. Fr. 1-4.

E. hortensis M. Bieb. An exotic appears to be cultivated in some parts of KHASI HILLS for the fruit, which is sweet when ripe and is edible.

FAM. 120. LORANTHACEÆ.

Parasitic evergreen shrubs. Leaves usually opposite, less often alternate, entire, exstipulate, coriaceous, or reduced to scales or obsolete. Flowers 1-2 sexual, regular or zygomorphic, in racemes spikes heads or fascicles, bracteate, sometimes bracteolate. Perianth double; outer (calycine) adnate to the ovary; limb annular or cupular, entire or shortly toothed or 0; the inner petaloid; segments 3-8, valvate in bud, connate into a tube or sometimes free. Stamens curved, opposite to the petaloid segments and more or less adnate to them; pistillode is present in male and staminodes in female flowers. Ovary 1-celled, inferior; placenta not differentiated; style short or long; stigma simple. Fruit drupaceous or baccate with a viscid inner layer by means of which it adheres to the future host; albumen fleshy or 0; embryo straight; radicle superior.

I have followed Prof. B. H. Danser in the system for the Genera of Loranthaceae.

The following literature have been consulted.

1. A revision of the Philippine Loranthaceae by Prof. B. H. Danser.

Leafless:—
   Internodes of each stem flattened in one plane:—
      No bracts between the flowers. . . 1. Korthalsella.
Flattenings of the internodes alternating:—
      Bracts below the flowers. . . 2. Viscum.
Leafy:—
  Ebracteolate:—
   Inner perianth 4-5:—
      Petals not hastately broadened:—
         Thecae more oblong to linear:—
            Pollen grains bilocellate. . . 3. Helixanthera.
   Inner perianth 4-6:—
      Petals not hastately dilated above the base:—
         Thecae globose to semi-globose. . . 4. Hyphear.
   Inner perianth 4:—
      Corolla zygomorphic:—
         Stamens straight. . . 5. Taxillus.
      Corolla sympetalous:—
         Ovary and fruit slightly (or not) attenuate at the base:—
            Flowers slightly zygomorphic (5):—
               Filaments and anthers normal. .
            Ovary and fruit strongly attenuate towards the base:—
               Flowers zygomorphic (4 merous):—
                  1 bract at the base of each flower.
               Flowers quite regular (5 merous):—
                  Bracts of the involucr free or more or less connate and quite different from the normal leaves. 6. Dendrophthoe.
Bracteolate:—
  3 bracts at the base of each flower:—
     Flowers 6-merous. . . 7. Scurrula.
     Flowers 6-merous.


Undershrubs, parasite. Leaves rudimentary, opposite, the pairs more or less united to collars at the top of the
internodes. *Flowers* in clusters in the leaf axils surrounded by hairs. *Male flower* buds globose; perianth segments 3, triangular, valvate; stamens connate into a globose column with 6 loculi, opening by slits towards the centre; pollen grains globose, poring out from a single central apical pore. *Female flower* bud clavate or pear-shaped; perianth segments 3, short, triangular, valvate. *Ovary* inferior; stigma nipple-shaped. *Fruit* clavate or pear-shaped crowned by the persistent sepals. *Seed* solitary, flattened.


An erect branched parasitic undershrub; glabrous, usually 5 in. long; internodes applanate; the unbranched extremities with about 5 internodes. *Basal* portion of the plant cylindrical at base, somewhat flattened at apex; internodes narrow-spathulate to oblong-spathulate, 4-1 in. long and 17-33 in. broad. *Flowers* numerous, axillary, minute. *Fruit* pyriform, 0.05 in. long.

1,200-1,500 m. KHASI HILLS, Mawrong.

**2. VISCUM Linn.**

Parasitic shrubs. *Leaves* opposite, flat and thick or reduced to scales. *Flowers* usually monœcious (sometimes dioecious) small, solitary or fascicled. *Bracts* small; bracteoles 2, free or connate in a cup, rarely obsolete. *Perianth* tube in male flowers short, solid in female flowers, adnate to the ovary; lobes 3-4, green or yellow; anthers sessile, adnate to the perianth lobes; cells confluent, dehiscence by many pores. *Ovary* inferior; stigma pulvinate. *Fruit* baccate, succulent with viscid mesocarp. *Seed* adnate to the pericarp; albumen copious; embryo solitary or 2 in each seed.

Branches leafy. Branches leafless.


A leafy parasitic shrub; branches slender, terete with only last 2 internodes flattened. *Leaves* 1.5-4 by 5-2 in., yellowish green, lanceolate or narrowly elliptic, somewhat falcate,
acute or acuminate, thinly coriaceous, glabrous, 3-5 nerved; base narrowed into the very short petiole which is \(0.05 \cdot 1\) in long. *Flowers* in axillary fascicles; bracteoles apiculate. *Perianth* lobes 4. *Berry* oblong or ellipsoid, shortly stipitate, \(2 \cdot 3\) in. long, yellowish.

LAKHIMPUR, DARRANG, GOALPARA, KHASI & JAINTIA HILLS (upto 3,200 ft.).
Parasitic on Randia dumetorum, Dalbergia tamarindifolia, Grewia multiflora and Macaranga denticulata.

Flrs. & Fr. Cold season.

2. *Viscum articulatum* Burm.

A pale green much branched often sub-verticellate parasitic shrub. *Branches* flattened, striate, readily disarticulating and contracted at the nodes. *Leaves* \(0.75 - 2.25\) by \(1 - 2.25\) in., reduced to scales. *Flowers* minute, 3-4-merous, sessile in clusters of 1-6 at the nodes in connate cupular bracts; lateral flowers usually males. *Perianth* segments triangular, reflexed in male, erect as female flowers. *Berry* about \(0.25\) in. long, sub-globose, yellow, smooth.

KHASI & JAINTIA HILLS (upto 5,500 ft.).
Paste of the plant is applied on cuts, etc., for healing. Parasitic on Loranthus odoratus, Castanopsis Hystrix.

Flrs. & Fr. Cold season.

3. *HELIXANTHERA* Lour.

*Inflorescence* racemose or spicate. *Flowers* with a single bract; corolla 4 to 7-merous. *Anthers* basifixed, usually 2-celled.

*Inflorescence* many-flowered glabrous:—

<table>
<thead>
<tr>
<th>Style jointed in the middle.</th>
<th>1. <em>H. parasitica</em>.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Inflorescence</em> many-flowered, tomentose:—</td>
<td>2. <em>H. coccinea</em>.</td>
</tr>
<tr>
<td>Style not jointed.</td>
<td>3. <em>H. ligustrina</em>.</td>
</tr>
<tr>
<td><em>Inflorescence</em> few-flowered, rusty-pubescent; young parts pubescent.</td>
<td>4. <em>H. terrestris</em>.</td>
</tr>
<tr>
<td><em>Inflorescence</em> few-flowered, glabrous:—</td>
<td>Quite glabrous plant.</td>
</tr>
</tbody>
</table>

Large, much branching; branchlets stout, terete. *Bark* blackish. *Leaves* 2-5 by ·6-2 in., opposite, sometimes alternate, ovate-lanceolate, rarely elliptic or sub-orbicular, acute or acuminate, entire, glabrous (young leaves reddish); lateral nerves 6-8 on either half; base rounded or alternate; petiole ·3-·8 in. long. *Flowers* 4-5 merous (including pedicels and rachis), bright red, adpressed to the rachis which at least when very young is puberulous in axillary racemes, solitary or in pairs or threes. *Bracts* ovate, acute, ciliate. *Corolla* inflated, 5-angled; lobes spreading, about ·1 in. long, reflexed, linear-elliptic; anthers elliptic, exserted; style jointed, upper half terete, lower usually 5-angled. *Fruit* usually ellipsoid, truncate, crimson, ·3 by ·2 in.

SIBSAGAR, LAKHIMPUR, KAMRUP, GOALPARA, N. C. HILLS, KHASI & JAINTIA HILLS (upto 4,000 ft.).

Parasitic on *Litsæa polyantha, Antidesma diandrum, Vatica lanceæfolia* and *Quercus serrata.*

Flrs. 1-3. Fr. 5-7.


Branchlets terete, stout, pale-brown, often lenticellate, tubercled. *Leaves* 1·5-4 by ·6-1·5 in., (local species), alternate or sub-opposite, ovate, ovate-lanceolate, bluntly acute, coriaceous, usually sparsely puberulous or glabrate; lateral nerves 4-7 on either half, rather very faint; base rounded or shallow cordate; petiole ·2-·4 in. long. *Flowers* yellowish (King) 4-merous, pubescent, in axillary many-flowered rusty-pubescent racemes, solitary or in pairs. *Calyx* cylindric, obscurely 4-toothed. *Petals* crimson; style slender, 4-sided; stigma capitate. *Fruit* ovoid, reddish-brown, 4-angled, crowned by the calyx.

SIBSAGAR, KAMRUP, KHASI HILLS (5,000 ft.).

Parasitic on *Melia Azedarach.*

Flrs. 3-5. Fr. Rainy season.

A parasitic shrub, often apparently terrestrial. *Branches* terete, stout, lenticellate. *Bark* darkish brown; young parts pubescent. *Leaves* 1.5-4 by 4.2 in., opposite, the upper sometimes alternate, narrow or elliptic-lanceolate, acute or obtuse, coriaceous, glabrous, shining; nerves obscure; base acute or narrowed into the petiole, 0.05-0.25 in. long. *Flowers* 4-merous, 3 in. long, red outside, in axillary few-flowered short racemes. *Calyx* entire. *Petals* linear, reflexed from the middle. *Style* slender; stigma capitate. *Ovary* tomentose. *Fruit* brown when ripe, 0.16-0.25 by 0.09-0.1 in.

**LAKHIMPUR, DARRANG, GOALPARA. GARO HILLS, KHASI & JAINTE HILLS** (upto 6,000 ft.).

Parasitic on *Machilus Gamblei*, *Phyllanthus Emblica*, *Eurya acuminata*, *Castanopsis tribuloides*, *Ficus clavata*, *Saurauja punduana* and *Glochidion obtatum*.

Frs. 10-11. (Hills) (3-4 plains). Fr. 1-2 (Rainy season plains).


Similar to *Loranthus ligustrina*, quite glabrous, the leaves are thinner and the nerves distinct. *Racemes* larger, probably a root parasite (Brandis).

**KHASI HILLS** (upto 3,000 ft.). Hooker, Thompson.

4. **HYPHEAR** Danser.

Flowers hermaphrodite or dioecious, in spikes; each flower subtended by a single bract. *Flowers* in spikes. *Corolla* choripetalous, 5-6-merous. *Anthers* basifixed; thecae 2, globose or semi-globose, each with 2 white or yellowish loculi 1.1-17 in. long. *Style* clavate (in bisexual and female flowers). *Fruit* sub-globose.


Glabrous, bushy. *Bark* dark-purplish. *Leaves* 2-6 by 6-1.5 in., mostly opposite or sub-opposite, lanceolate or elliptic, sometimes falcate, entire, acute or bluntly acuminate,
fleshy (rather thin for the gum) glabrous; nerves very slender; midrib brown or yellow; base rounded or cuneate; petiole 2.8 in. long. Flowers yellowish, fragrant, small in axillary often fascicled spikes. Calyx produced beyond the ovary. Petals free, 6 in., spathulate. Fruit glabrous, ellipsoid.

CACHAR, MANIPUR (Brandis), KHASI & JAIN'TIA HILLS (upto 6,000 ft.).
Parasitic in Quercus fenestrata & Quercus Griffithii.

Flrs. Cold season. Fr. 4.

5. TAXILLUS Van Tiegh.
Flowers in 2-5 rayed umbels, each with 1 bract. Corolla 4-5-numerous, zygomorphic; tube long, swollen and curved before flowering; lobes 4-5, reflexed, more or less to one side in neck in the flower, one slit usually larger. Anthers basifixed, 4-locular. Style without articulation, as long as the corolla. Ovary and fruit hardly alternate towards the base. Fruit ovoid or ellipsoid; exocarp coriaceous, mesocarp viscous.

A large parasite, sometimes erect (on Quercus Griffithii); branches stout, terete, lenticellate. Bark brown or blackish; young parts softly tomentose. Leaves 1.5-3 by 6-1.5 in., ovate or elliptic, lanceolate, obtuse, coriaceous. glabrous above, brown or tawny tomentose beneath; lateral nerves 4-5 on either half, quite distinct on the undersurface; base rounded or obtuse; petiole 1.5 in. long. Flowers 5-8 in. long, in sessile or pedunculate axillary fascicles. Buds clavate. Calyx truncate. Corolla tube split; lobes 4, obtuse; anthers red. Fruit 3-5 in., orange, ellipsoid, glabrous.

KHASI & JAIN'TIA HILLS (6.000 ft.).
Parasitic on Quercus Griffithii, Castanopsis Hystrix and Pygeum montanum.

Flrs. & Fr. 9-1.
6. DENDROPHTHOE Martius.

More or less robust shrubs. Flowers in simple racemes or spikes, each with 1 bract. Corolla slightly zygomorphic; lobes 5; tube more or less dilated, the bud constricted to a neck above the tube, clavate at the top. Filaments normal; anthers basifixed, little broader than the filaments, obtuse or acute; thecae 4, rarely locellate. Ovary and fruit slightly (or not) alternate at the base; exocarp coriaceous; mesocarp viscid.

Flowers glabrous:—
Corolla 1·2-2 in. long; lobes shorter than the tube:—
Scarlet or orange. ... 1. D. falcata.

Flowers finely pubescent:—
Corolla 0·51 in. long; lobes twice the length of the tube, green outside, yellow within. ... 2. D. pentandra.


A large glabrous bushy parasite. Bark grey or reddish brown. Leaves 2·5-6 by 0·8-3 in., opposite or sub-opposite, sometimes alternate, very variable in shape, ovate, obovate, obovate-oblong or elliptic, sometimes oblique, obtuse, coriaceous, rather fleshy, glabrous; midrib red; lateral nerves obscure; petiole 1-5 in. long, stout. Flowers 1·2-5 in. long, orange or scarlet, in dense (10-25 flowered) unilateral, up-curved axillary or supra-axillary racemes, sometimes solitary. Calyx tooth produced beyond the ovary. Corolla glabrous: tube 0·1 in. in diameter at base, gradually expanding to 0·2 in. in diameter at apex; lobes 5, shorter than the tube, greenish yellow; style slender, green, sub-persistent; stigma globose. Berry 0·3-0·5 in. long, oblong, black when ripe, crowned with the cupular calyx.

SYLHET, GOALPARA, GARO HILLS, KHASI & JAINTIA HILLS (5,500 ft.).
Parasitic on Mangifera indica, Premna latifolia, Hydnocarpus Kurzii, Terminalia Chebula.

Flrs. & Fr. 7-11. (Almost throughout the year).

A parasite of considerable size. *Branch* and branchlets stout, terete, shining grey, lenticellate; youngest parts puberulous. *Leaves* 2-6 by 1·2-4 in., alternate or sub-opposite, variable in shape, elliptic-lanceolate, obovate, obtuse or acute, undulate, coriaceous, glabrous; midrib stout; lateral nerves very faint, reticulation obscure; base cuneate or narrowed into the petiole, which is 2-3.5 in. long. *Flowers* finely pubescent in axillary racemes, sometimes fascicled. *Bract* ovate, embracing the base of the calyx. *Calyx* 5-toother, cupular, tomentose. *Corolla* green outside, yellowish within; lobes 5, equal, linear, twice the length of the tube; style capitate. *Fruit* ovoid, 3 in. long, crowned by the calyx.

SYLHET (Brandis).
Frs. 12. Fr. 3.

7. **SCURRULA** Linn.

Leaves tomentose mealy or scarfy. *Inflorescence* racemose; flowers with a single bract. *Corolla* 4-merous, zygomorphic, narrowed in the middle, somewhat clavate at the apex, recurved. *Anthers* basifixed, obtuse, 4-celled. *Style* as long as the corolla. *Fruit* pyriform, ellipsoid or clavate, exocarp coriaceous; mesocarp viscous; endocarp infundibuliform, quadrangular, woody.

Perianth 4-merous:—

Leaves mealy or scarfy:—

Fruit pyriform. .. .. .. .. 1. *S. parasitica*.
Fruit clavate. .. .. .. .. 2. *S. pulverulenta*.

Leaves tomentose:—

Fruit ellipsoid. .. .. .. .. 3. *S. umbellifer*.


A large bushy, very variable parasitic with many distinct varieties; young parts tomentose (rusty or white). *Leaves* 1·5-3·5 in., opposite, elliptic-oblong, ovate-oblong, obovate, obtuse or acute, coriaceous, scurfy or tomentose (rusty or grey) on both surfaces when young, glabrous above when
mature; nerves rather faint; base rounded or cordate; petiole 0.25-0.5 in. long. Flowers 1-2 in. long, in dense axillary fascicles or short racemes. Buds club-shaped. Calyx quite truncate. Corolla tube split, red, 0.25-0.3 in., portion of the inside purple and pubescent outside, slightly curved; lobes 4, linear, greenish-yellow; filaments flat and purple below, but red and much narrower and immediately below the anthers; style filiform, purple (young first club-shaped, tipped reddish). Fruit 0.2-0.3 in. long, pyriform.

SIBSAGAR, MANIPUR, GARO HILLS, KHASI & JAINTIA HILLS (upto 4,500 ft.). Parasitic on Wendlandia Wallichii, Grewia Microcos, Bridelia montana and Myrica Nagi. It is a very bad pest of Gmelina arborea—R. N. De.

Flrs. & Fr. 11-3.

Scurrula gracilifolia (Schultes) Danser (Syn. Loranthus Scurrula Var. graciliflora Kurz) is also recorded from the region of the Flora.


A common stout woody parasite. Bark darkish grey; branches lenticellate; young shoots white, floccose. Leaves 2-6 by 0.5-3 in., opposite, broadly ovate or ovate-oblong, acute or obtuse, coriaceous or chartaceous, densely soft tomentose when young on both surfaces; lateral nerves distinct; base rounded or acute; petiole 0.3-0.7 in. long. Flowers 1.1-1.5 in. long, buff-coloured, in axillary, often fasciculate racemes covered with soft grey tomentum. Corolla tube split on one side, curved lobes 4; style red. Fruit club-shaped, supported by a bract at the base, 0.5 in. long.

Specimen No. 6039 (Kanjilal) has got oblong truncate fruit 0.25-0.3 in. long, somewhat rugose.

N. E. F. TRACT. KAMRUP, GOALPARA, CACHAR, KHASI & JAINTIA HILLS (upto 4,000 ft.). Parasitic on Garuga pinnata, Cedrela sp., Quercus fenestrata, Dillenia indica. Symplioces spicata, Sauranja penduana, Myrica Nagi, Pourthia arguta, Mæsa ramentacea and Castanopsis tribuloides.

Flrs. & Fr. 11-1.

A stout parasite. *Bark* greyish; branchlets lenticellate, youngest parts rusty-pubescent. *Leaves* 1·3-4 by ·5-2 in., opposite or alternate, elliptic or elliptic-oblong, acute or obtuse, coriaceous; lateral nerves 4-7 on either half, distinct: base acute or narrowed into the petiole, which is ·2·5 in. long. *Flowers* red, 1-1·5 in. long. *Calyx* obscurely 4-toothed; tube very small. *Corolla* tube slender, slightly swollen, curved; lobes 4; stigma capitate. *Fruit* turbinate, ·3 in. long.

**CACHAR, KHASI & JAIINTIA HILLS** (5,500 ft.).
Parasitic on *Vatica lanceafolia* and *Symplocos spicata*.

Frs. & Fr. 8-12.


A slender bushy parasite. *Branches* woody, terete, purplish-brown, lenticellate; young parts tomentose. *Leaves* 2-6 by 1·3-5 in., opposite and alternate, ovate, ovate-lanceolate or elliptic-ovate, obtuse or sub-acute, subcoriaceous, glabrate or pubescent especially along the nerves; lateral nerves 4-5 on either half, slender; base rounded or shallow cordate; petiole ·2·5 in. long. *Flowers* laxly villous, sessile, in fascicles of 4 in one involucre of 4 large foliaceous bracts. *Bracts* free as long and much wider than the flower. *Calyx* produced over the ovary. *Corolla* 5-cleft; lobes linear; tips recurved. *Fruit* ·2 in. long, oblong, truncate, pubescent.

**SIBSAGAR, LAKHIMPUR, KAMRUP, GOALPARA, SYLHET.**
Parasitic on *Litsæa* sp., *Lagerstromia parviflora*, *Styrax serrulatum*, *Delima sarmentosa*.

Frs. & Fr. 2-5.

9. **MACROSOLEN** Blume.

Inflorescence spicate or racemose, sometimes contracted to an umbel or almost to a head. *Flowers* bracteate;
bracteoles free or more or less connate; bud constricted to a neck; tip clavate. *Corolla* 6-merous, tube always inflated with 6 keels at the top alternating with the lobes. *Filaments* straight; anthers basifixed, broader before and narrower after opening than the filaments, obtuse; loculi 4, rarely locellate. *Style* articulate above the base. *Fruit* globose or ellipsoidal. *Seed* ellipsoidal.

Flowers in short racemes:—

Leaves glabrous:—

Petiole ·1-·3 in. long:—

Fruit pale-yellow. . . . . 1. *M. cochinchinensis*.

Flowers sessile or decussate or in short few flowered spikes:—

Leaves glabrous:—

Petiole ·3-·7 in. long:—

Fruit bluish (ripe). . . . . 2. *M. psilanthus*.


Branches stout, terete, lenticellate. *Bark* pale-brown. *Leaves* 2-5 by 1-2·5 in., usually opposite, rarely alternate, elliptic, elliptic-lanceolate, ovate, broadly acuminate, thickly coriaceous, glabrous, shining; midrib conspicuous, impressed above; lateral nerves irregular, distinct, 5-7 on either half, slender; base acute or cuneate; petiole ·1-·3 in. long. *Flowers* ·5-·8 in. long, in axillary racemes, single or in pairs or sometimes clustered. *Buds* clavate; bracts ovate; bracteoles connate, cupular. *Calyx* lanceolate, truncate. *Corolla* white including the throat (Kanjilal); tube 6-angled, campanulate and slightly gibbous; lobes 6, reflexed at the middle, glabrous outside; tips purplish. *Fruit* ellipsoid or nearly so, pale-yellow, ·3 by ·25 in., supported by the bracteole cup.

**LAKHIMPUR, NOWGONG, GOALPARA, CARO HILLS.**

Parasitic on *Careya arborea*, *Artocarpus integrifolia*, *Salix tetrasperma*, *Machilus bombycina*, *Antidesma sp.*, *Shorea robusta*, *Macaranga denticulata*, *Lagerstroemia parviflora*, and *Eugenia Jambolana*.

Flrs. 12-3. Fr. 3-4.

A robust glabrous shrub; branchlets lenticellate. *Bari* pale-whitish, thin, rough. *Leaves* 2-5·5 by 1-2·2 in., opposite, ovate-oblong, ovate-lanceolate or elliptic-lanceolate: blaze white, oblong, acute or acuminate, coriaceous, glabrous; midrib stout; nerves slender, rounded or cuneate; petiole 2-6 in. long. *Flowers* 2-2·5 by 1 in., sessile on few-flowered umbellate peduncled spike, often from the old wood. *Bracts* and bracteoles shorter than the calyx. *Calyx* tube much longer than the ovary. *Corolla* tubular, very slender; lower half red; upper half green; lobes 6, linear. *Fruit* obovoid, sessile, 3 in. long, bluish-white when ripe.

**ASSAM, MANIPUR** (Brandis), **KHASI & JAIN'TIA HILLS** (6,000 ft.).

Parasitic on *Quercus dilatata*, *Castanopsis tribuloides* *Castanopsis Hystrix*, *Quercus lineata*, *Sarcosperma* sp., *Schima Wallichii*, *Pyrus Pashia*.

Flrs. 12-4. Fr. Rainy season.

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**FAM. 121. SANTALACEÆ.**

Trees, shrubs or herbs, mostly parasitic or semi-parasitic. *Leaves* entire, alternate or opposite, sometimes scale-like or 0, extistipulate. *Flowers* unisexual or hermaphrodite, regular, in variously arranged inflorescence. *Perianth* 3-8, toothed, lobed or partite; segments often with a tuft of hairs behind the anthers. *Stamens* as many as and opposite to the perianth lobes; anthers 2-celled. *Disc* perigynous or epigynous. *Ovary* nearly free, 1-celled; style short; stigma entire or 3-6 lobed; ovules 1-3; placenta central. *Fruit* nut or drupe. *Seeds* globose or ovoid; testa obsolete or very thin;
albumen copious, fleshy; embryo usually terete, radicle superior.

Santalum album Linn. The sandal wood. Chandan, Sans. & Beng. indigenous in Deccan peninsula. It is the most important species of this family and is of greatest economic importance.

Perianth superior; tube adnate to the ovary (not produced above it) :

Leaves alternate :—
Anther cells divergent or confluent :—
Parasitic on branches or stem. . . 1. Henslowia.
Anther cells distinct or parallel :—
Independent trees or shrubs or root parasite :—
Male flowers in axillary pedunculate clusters :—
Stamens without interposed processes, unarmed. . . 2. Osyris.
Male flowers in tomentose panicles :—
Stamens with interposed processes, often thorny. . . 3. Pyrularia.

1. HENSLOWIA Bl.

Parasitic glabrous shrubs. Leaves alternate. Flowers minute, monoeccious or dioecious, supported by small bracts. Perianth tube 0 in male, adnate to the ovary in female; lobes 5-6, valvate. Stamens 5-6, inserted on the perianth lobes; anthers didymous. Ovary inferior; stigma sub-sessile, discoid or lobed; ovules 2-3. Drupe ovoid, obovoid-ellipsoid or sub-globose; endocarp hard; embryo linear.

Branches densely pustulate :—
Leaves obovate to spathulate :—
Bracts covering the whole length of the fruiting pedicel. . . 1. H. granulata.
Branches smooth or sparingly pustulate :—
Leaves elliptic-ovate to orbicular :—
Bracts at base and below the fruit. . . 2. H. heterantha.

1. Henslowia granulata Hk. f.

A small parasitic shrub. Branches densely pustulate. Leaves 1-2 by 4-9 in., obovate to spathulate, entire, obtuse,
coriaceous, thick, glabrous; lateral nerves 5-9, basal nerve not very distinct; base narrowed into a short petiole. Fruiting pedicel clothed with imbricating bracts the whole length. Perianth 5-lobed; female flowers without stamens; stigma obscurely lobed. Fruit small, obovoid; pyrene 3-4 in. long, 5-furrowed.

KHASI HILLS (5-6,000 ft.).

Flrs. 7. Fr. Cold season (11).

2. Henslowia heterantha Hk. f. & T.

A small parasitic shrub. Branches pale-brown, sometimes parasitic (on Leea bracteata). Leaves variable, 1-3.5 by 4.1-5 in., obovate to orbicular, entire, obtuse, thickly coriaceous, glabrous, with 5-9 basal nerves, more prominent beneath; base narrowed into a short petiole which is 0.05-1 in. long. Male flowers sessile in pedunculate heads. Female flowers with or without imperfect stamens. Fruiting pedicels clothed with bracts at the base and tips only; stigma shortly 5-lobed, sub-sessile. Fruit small, red, ellipsoid, fascicled in pedicels, 13 in. long; pyrene 5-6-furrowed.

MANIPUR, KHASI & JAINTIA HILLS (5,000 ft.).

Flrs. 10-2. Fr. Hot season (6).

2. OSYRIS Wall.

Osyris arborea Wall.

A fairly large twiggy glabrous shrub or small tree; branchlets sharply 3-angled. Leaves alternate, 1-2.5 by 4.8 in., obovate, elliptic-oblong or lanceolate, entire, mucronate, coriaceous, glabrous; midrib prominent beneath; petiole sub-sessile or short, emarginate. Flowers minute, polygamous; male-flowers in axillary peduncled clusters; female-flowers usually solitary, axillary, on long slender pedicels. Perianth superior, obconical; segments valvate. Drupe sub-globose, 3 in. across, glabrous, red when ripe.

MANIPUR (Watt. 6679).

Flrs. Almost throughout the year. Fr. Cold season chiefly.
3. PYRULARIA A.DC.


A small or middle sized deciduous tree, usually thorny (U. Kanjilal says nerves are thorny) enclosed by linear silky imbricating scales. *Leaves* 2-6 by 7-2.5 in., elliptic-oblong or ovate-oblong, acute or acuminate, entire or obscurely crenulate towards the apex, coriaceous, glabrous, shining above; lateral nerves 4-6 on either half, oblique, arcuate, impressed above, prominent beneath; petiole 1-1.5 in. long. *Male flowers* in tomentose racemose panicles. *Female* solitary. **Perianth** tube solid in the male, in the female adnate to the ovary. *Male* perianth segments 5, triangular, acute. **Stamens** 5. **Ovary** inferior, clavate, pubescent; stigmas capitate; style short. **Drupe** pyriform or globose, 1-2 in. long, narrowed into a stout stalk, crowned with the perianth lobes. **Seeds** globose.

MISHMI HILLS, NAGA HILLS, MIKIR HILLS, KHASI & JAINTIA HILLS (upto 5,000 ft.).

Fruit edible. (Brandis).

Flrs. 4-6. Fr. 8-11.
FAM. 122. BALANOPHORACEÆ.

Reddish or yellow parasites (without chlorophyll) on tree roots to which the tuberous rhizome is attached by suckers. Leaves 0 or scanty. Inflorescence arises from the rhizome (sometimes developed within the rhizome and breaking through it) and forms into a spike or head. Flowers small, monœcious. Male flowers: perianth of 3-4 valvate lobes or 9 free or connate. Stamens as many as perianth lobes or more. Female flowers: perianth usually 0. Ovary 1-2-celled (rarely 3); ovule 1 in each cell. Fruit minute or drupe-like. Seeds usually adherent to the pericarp; testa thin or 0; alumen granular and oily; embryo very minute.

Balanophora dioica Brown.

Root parasite. Rootstocks tuberculous, each tubercle capable of producing a shoot. Shoots 1·5-2·5 in., somewhat stouter, covered with imbricating minutely rugose glabrous scales. Flowers in a fleshy clubshaped receptacle. Perianth surrounded by fleshy linear truncate bracts, which are somewhat reddish in colour almost square-headed. Heads ovoid, ·6 by ·5 in. Perianth segments white, generally 4, with occasionally a narrower 5th., very rarely a similar 6th., fleshy, ovate, concave, valvate, reflexed after opening, ·06 by ·05 in. Anthers only one, sessile, domeshaped, covered with wavy parallel ridges which bear pollen and bursts open before the perianth lobes expand. Some male flowers especially those that are borne on the lower half of the head are shortly stalked, others are sessile. Female flower heads oblong, ·75 by ·4 in. Flowers are very closely packed on the soft fleshy receptacle. Stigma protruded, large, white, many times larger than what appears to be the nut; style terminal.

KHASI & JAINTIA HILLS.

Flrs. & Fr. Cold season.
B. polyandra Griff. is also recorded from the region of the flora.

Rhopalocnemis phalloides Jungh.


KHASI & JAINTIA HILLS (5-6,000 ft.) Griffith. (F.B.I. V. P. 239).

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**FAM. 122(a). BUXACEÆ (Engler U. Prantl. III 5. 130).**

Evergreen shrub without latex. *Leaves* exstipulate, leathery. *Flowers* in heads or spikes, unisexual, regular, apetalous or naked; stamens 4- many. *Ovary* 3-locular; styles 3, persistent on the fruit; ovules pendulous, anatropous, 1-2 in each cell; *raphe* dorsal. *Fruit* loculicidal capsule or drupe. *Seed* with or without caruncle; endosperm present.

Leaves coriaceous:—

Leaves alternate; fruit indehiscent. .. 1. Sarcococca.  
Leaves opposite; fruit loculicidally dehiscent capsule. .. .. .. 2. Buxus.

**Buxus sempervirens** Linn. The box wood tree.

A small or middle sized tree; branchlets 4-sided; bark yellowish grey, soft, corky, fissured on old stems. *Leaves* opposite 1-3 by ·2-·4 in., linear-oblong or lanceolate, acute, obtuse or retuse, coriaceous, shining, glabrous; base rounded or obtuse; petiole very short. *Flowers* sessile, *monœcious*, bracteate, in short congested axillary spikes. *Male flowers* perianth (calycine) 2 pairs, imbricate one under the other, yellowish; stamens 4, free, exserte. *Female flowers* perianth (calycine) 6 in 2 or 3 series all imbricate, outer smallest, yellowish. *Ovary* 3-celled; style 3, simple, short, thick; ovules 2 in each cell. *Capsule* ·5 in. long, ovoid.
Ioculicidally 3-valved. Seeds oblong, trigonous; testa black, shining; albumen fleshy.

Shillong, KHASI HILLS, (Planted ?)
Box wood, yellowish white. Used for engraving, turning, carving and mathematical instruments.

Flrs. 5-7. Fr. 7-8.

**SARCOCOCCA** Lindl.


An evergreen shrub (10'/3'') glabrous, often gregarious. Bark green. Leaves variable, 2-6·5 by ·8-2 in., elliptic, lanceolate or elliptic-lanceolate, acuminate, quite entire, coriaceous, glabrous, shining above, conspicuously tripli-nerved at the base; other lateral nerves above the basal pair; fainter midrib impressed above, prominent beneath; base usually rounded, sometimes acute; petiole ·2-·7 in. long. Flowers ·3 in. across, pale yellow in short axillary racemes; bracts whitish, decussate. *Sepals* 4, biseriate, imbricate. *Stamens* 4, free, opposite to sepals and much longer than the sepals. *Ovary* 2-3-celled; ovules 2 in each cell. *Fruit* ·3-·5 in. long, ovoid, purple when ripe.

MANIPUR, NAGA HILLS, K. & J. HILLS (upto 8,000 ft).

Flrs. 4-5. Fr. 6-7.
FAM. 123. EUPHORBIACEÆ.

 Mostly shrubs or trees, a few herbaceous, rarely climbers, often with milky juice. Leaves alternate, sometimes opposite above and alternate below, usually stipulate (often represented by hair like bodies, glands or thorns). Flowers usually small, unisexual, monœcious or dioecious. Inflorescence usually complex, almost of every type; perianth is sometimes 2-whorled, 5-merous, but more often only one (calycine) whorl, sometimes the perianth is absent in both sexes. Calyx often different in both sexes. Stamens 1-merous, free or united in various ways; anthers usually 2-celled, rarely 4-celled, dehiscing longitudinally or sometimes transversely. Disc various, acute or entire, lobed or of few scales or 0. Ovary usually 3-locular; style bilobed; ovules 1 or 2 in each loculus, collateral, pendulous, anatropous, with vertical raphe; micropyle is often (in many genera) covered by a caruncle which is also found in the seed. Fruit usually a schizocarp capsule, sometimes indehiscent and drupaceous. Seeds albuminous; embryo straight; radicle superior; cotyledons fleshy, broad and flat.

Flower heads resembling single flower consisting of pedicelled bracteoles; stamens in male flowers surrounding a single female pedicelled flower:—

Involucre regular or nearly so, 4-5 lobed:—
Ovary-cells 1-ovuled. .......................................................... 1. Euphorbia.

Flowers distinct, not contained in an involucre, not united in heads:—
Ovary cells 2-ovuled:—
Leaves compound, trifoliolate:—
Flowers panicled:—
Calyx 5-lobed. .............................................................. 2. Bischofia.
Leaves simple, alternate:—
Petals present:—
Calyx valvate:—
Ovary 2-celled:—
Fruit drupaceous with 2-pyrenes. ...................................... 3. Bridelia.
Ovary 3-celled:—
Calyx imbricate:—
Male disc 5-lobed:—
   Cotyledons crumpled. . . . . 5. Actephila.
Male disc of 5-bifid glands:—
   Cotyledons flat. . . . . 6. Andrachne.

Petals wanting:—
Calyx segments 5 in both male and female:—
   Stamens 5; filaments connate:—
      Capsule small, the crustaceous cocci splitting into two. . . . . 7. Neopeltandra.
   Stamens 3; filaments connate wholly or partially (some times not at all):—
      Capsule with 3-crustaceous or thin 2-valved cocci. . . . . 8. Phyllanthus.
Calyx segments 4 in male, 6 in female:—
   Stamens 2 or 4, filaments connate:—
      Capsule with 3 thin 2-valved cocci. . . . . 9. Reidia.
Calyx segments 4 in both male and female:—
   Stamens 4; filaments free:—
      Capsule globose, 6-seeded. . . . . 10. Prosporos.
Calyx segments 5-6 in both sexes:—
   Stamens 5; filaments free:—
      Berry 2-celled, 3-seeded. . . . . 11. Flueggeopsis.
Calyx segments 5:—
   Stamens 5 in 2-series; outer filaments free, inner connate:—
      Fruit a small fleshy 5-12-celled berry. . . . . 12. Kirgenelia.
Calyx segments 5-6:—
   Stamens 3; filaments connate in a column:—
      Fruit large; depressed globose, fleshy, with 3-bony two-valved cocci. . . . . 13. Emblica.
Calyx segments 5:—
   Stamens 5 or fewer:—
      Fruit dry or fleshy. . . . . 14. Flueggea.
Stamens 4-8:—
   Fruit capsular, globose:—
      Seeds imbedded in an aril. . . . . 15. Baccaurea.
Stamens 1-5:—
   Fruit capsular, bursting irregularly:—
Fruit drupaceous:—
   Petiole less than 1 in.:—
      Ovary 1-celled, raphe ventral. . . . . 17. Antidesma.
   Petiole more than 1 in. long:—
      Ovary imperfectly 2-celled. . . . . 18. Daphniphyllum.
Petals 0:—
Male flowers solitary in clusters or fascicles:—
  Styles and style-arms slender:—
    Disc combined with the calyx segments; the stamens in column:—
      Anthers adnate to the angle of the trigonous column:—
        Calyx of male and female spreading .. 19. Sauropus.
      Anthers adnate to the whole length of the column:—
        Calyx of male flowers turbinate, that of female flower spreading. .. 20. Breynia.
  Style-arms much dilated:—
    Fruit drupaceous, indehiscent:—
      Stamens 4-many:—
        Ovary 2-4-celled:—
          Drupe 2-4-seeded. .. .. 21. Dryptes.
        (Cyclostemon)
      Stamens 2-4;—
        Drupe 1-seeded. .. .. 22. Putranjiva.
    Style confluent into a long or short column or cone, slightly toothed at the apex:—
      Stamens 3-8, connate:—
        Disc obsolete:—
          Capsule of 3 or more 2-valved cocci. .. 23. Glochidion.
  Ovary cells 1-ovuled:—
  Petals present:—
    Inflorescence terminal:—
      Flowers in androgynous compound cymes:—
        Calyx segments 5, imbricate:—
        Calyx segments 2-3, valvate:—
      Flowers in androgynous spikes or racemes:—
        Calyx segments imbricate or valvate; filaments inflexed in bud:—
    Inflorescence usually axillary:—
      Flowers racemed or panicled:—
        Sepals imbricate, not enlarged in fruit:—
          Style short, bifid:—
            Stamens 3; anthers sessile or on a cylindric column. .. .. 27. Trigonostemon.
        Sepals imbricate, usually enlarged in fruit:—
          Flowers in male apetalous. .. .. 29. Blachia.
Sepals valvate:
   Stellate-tomentose anther cells contiguous, parallel. .. 30. Sumbavia.

Petals O. Calyx campanulate:
   Stamens 10, free. .. 31. Manihot.
   Anthers sessile, 5-10, adnate to a column. .. 32. Hevea.

Petals O. Sepals imbricate:
   Male flowers in fascicles:
      Fruit smooth, tardily dehiscent:
         Leaves pellucid-punctate. .. 33. Gelonium.
         Fruit capsular, echinate. .. 34. Chaetocarpus.

Male flowers in panicked cymes:
   Capsule of two-valved cocci. .. 35. Baliospermum.

Petals O. Calyx sub-vertically 4-lobed; leaves not punctate:
   Male flowers racemed:
      Fruit indehiscent. .. 36. Endospermum.

Petals O. Sepal or calyx segments valvate:
   Trees or shrubs:
      Filaments free:
         Stamens 2 or 3:
            Male calyx 2-3 fid. .. 37. Sapium.
            Male calyx of 3-sepals. .. 38. Excoecaria.
      Filaments usually free:
         Anthers 2-celled:
            Stamens 6-many:
               Leaves alternate:
                  Anther-cells divaricate:
                     Style laciniate. .. 39. Acalypha.
                     Style entire. .. 40. Claoxylon.

      Anther-cells contiguous, parallel:
         Filaments slender:
            Cocci crustaceous, 2-4-valved. .. 41. Alchornea.

   Filaments free or united at base; anthers 2-celled:
      Stamens numerous:
         Fruit indehiscent:
            Style linear. .. 42. Trewia.
      Fruit capsular:
         Style plumose. .. 43. Mallotus.
      Anthers 4-celled or 2-celled, 4-valved:
         Stamens 1-many:
            Capsule large:
               Style entire. .. 44. Macaranga.
Capsule small:—
  Style branched. ...  45. Cleidion.

Filaments connate in bundles:—
  Staminal bundles indefinite:—
  Leaves entire, pennis-nerved. ...  46. Homonoia.
  Leaves palmately-lobed. ...  47. Ricinus.

Twining shrubs or climbers with stinging hairs:—
  Cocci not winged:—
    Calyx 3-lobed:—
      Calyx not enlarged in fruit. ...  48. Cnesmone.
    Calyx 3-5-lobed:—
      Calyx of fruit accrescent. ...  49. Tragia.
  Without stinging hairs:—
    Cocci winged. ...  50. Pterococceus.

1. EUPHORBIA Linn.

Herbs, shrubs or trees of various habits, always with milky juice; stem and branches fleshy. Leaves alternate or opposite, usually entire, often early deciduous or much reduced; stipules various. Flowers monœcious, pedicellate; flower heads resembling single flower, combined in an inflorescence of many male florets, surrounding a single female flower accompanied by many bracteoles. Involucre regular with 4-5 sepaloid lobes, campanulate; sinuses between the involucral lobes with thick glands which have sometimes petaloid limbs, processes or horns; bracteoles setaceous, sometimes combined in a sheath or 0. Perianth 0, or of minute scales. Male florets: stamens 1, jointed on a pedicel; anthers 2-celled, opening longitudinally. Female florets: pedicels often recurved; ovary 3-celled; style 3, free or connate; stigma entire or bifid; ovules solitary in each cell. Fruit a capsule of three 2-valved cocci, dehiscent; cocci separating elastically from a persistent axis. Seeds albuminous; testa more or less crustaceous; cotyledons broad, flat; radicle superior.

Armed (with stipular spines):—
  Style simple; stigma capitate:—
    Leaves 4 in. long, or more:—
      Branches subterete:—
        Stipular spines from distant tubercles. ...  1. E. Nivulia.
Branches angled:—
Stipular spines arising from sub-confluent
tubercles arranged on ridges in vertical
rows.

1. Euphorbia Nivulia Ham. Vern. Dieng-syrah,
Kh.; Sua, Synt.
A small tree or a shrub. Bark thick, corky, furrowed
on old stem; branches fleshy subterete; tubercles truncate,
bearing 2 stipular spines, 2-5 in. long. Leaves crowded
at the ends of branches, caduous, alternate, 5-10 by
1·25-2·5 in., obovate-oblong, obovate, spathulate or rounded,
mucronate, fleshy, glabrous; nerves obscure; base narrowed;
leaves sessile or sub-sessile. Flower heads peduncled, cymose
from axils of fallen leaves. Involucres greenish, transversely
oblong. Capsule about 4 in. across, trigonous. Seeds
small, round, smooth.

Khasi & Jaintia Hills. Common round homesteads (probably
cultivated).

Flrs. 2-3. Fr. 4-6.

2. Euphorbia neriifolia Linn. Vern. Sar-a Kh.;
Hiju-arong, Mik.; Hiju, Ass.
A shrub or small tree, glabrous; branches obscurely
5-angled with vertical rows of tubercles bearing sharp
stipular thorns, which are sub-confluent. Leaves crowded at
the ends of branches, deciduous, 4-8 by 1·5-5·25 in., obovate-oblong
or obovate-spathulate, sub-acute, mucronate, fleshy, smooth,
slabrous; base tapering, sessile or almost so; stipular spines about 5 in. long. Involucres ternate, forming
shortly pedunculate cymes, solitary or 2; central flowers
male; lateral bisexual; bracteoles many. Stamens many in

Khasi & Jaintia Hills; Plains of Assam. Apparently culti-
vated.
Worshipped by the Meches in Goalpara.

Flrs. 2-3. Fr. 4-5.
E. hirta Linn. (Syn, E. pilulifera Linn).
An annual hispid herb. Leaves opposite elliptic-oblong to oblong-lanceolate, acute, dentate or serrulate; base obliquely cordate, shortly petiolate.
Mentioned by U. N. Kanjilal as occurring in N. C. HILLS & KHASI & JAIN'TIA HILLS. (No specimen in Forest Herbarium, Shillong).

A perennial herb. Leaves 5-2 by 2-5 in., elliptic-lanceolate, obtuse, glabrous beneath except the nerves, which are too obscure. K. & J. HILL, fairly common in grass land (upto 600 ft.).
Fr. 11.

E. hypericifolia Linn.
A slender annual. Leaves opposite, 3-9 by 0.5 in., somewhat inequilateral, narrow-oblong, obtuse, serrate, sparsely pubescent; petiole 0-5 in. long; lateral nerves 3-4 on either half, distinct.
Plains of ASSAM.
Frs. 11.

E. Bojeri Hook.
With fleshy thick stem and deciduous leaves.
Cultivated in Shillong.

E. antiquorum Linn.
A large cactus-like shrub.
Cultivated in ASSAM for fencing. N. E. F. TRACT (Sadiya Block), UPPER ASSAM. Burkill's No. (36682, 36508).
Frs. 1.

E. Maddeni Boiss. E. thymifolia Burm. & E. Wallichii Hk. f.
are recorded from the region of the "Flora."

2. BISCHOFIA Blume.
A large deciduous tree with tall cylindric trunk and often of great girth (100'/15') usually with a spreading
crown. Bark dark brown outside; inside reddish, exuding reddish gum in thin parallel lines. Leaves alternate, 3-foliolate (sometimes 5-foliolate on luxuriant young shoots); common petiole 3-8 in. long. Leaflets 3-6 by 1.5-3 in., elliptic or ovate-oblong, acuminate, usually crenate, glabrous; lateral nerves 6-8 on either half, slender, petiolulate, terminal leaflet much longer. Flowers greenish, dioecious, apetalous in paniculate racemes. Male flowers shortly pedicellate; corolla segments 5, obtuse, concave, concealing the anthers; stamens 5; anthers globular; pistillode present in the form of a flat disc. Female flowers pedicellated (longer than male); sepals ovate, caducous; styles linear, entire; ovary 3 or 4-celled; ovules 2 in each cell. Fruit globose, baccate, fleshy, 25-5 in. across, exuding a gummy juice when squeezed, brown when fully ripe, supported on a thickened pedicel. Seeds smooth, shining; albumen fleshy; cotyledons flat.

Common throughout the Province (up to 4,000 ft.)

Wood red, moderately hard, but rather rough grained; heart wood small, darker; weight 40-50 lbs. per cft. More durable in water, used for various building purposes and dug-outs, splits badly and converted timber seasons very unsatisfactorily. Tried for impregnated Railway slippers, but very refractory to treatment.

Leaves are used to dye bamboo baskets, fans, etc.

Flrs. 3-5. Fr. Rainy season.

3. BRIDELIA Willd.

Shrubs or trees, sometimes climbing, often spinose (specially when young). Leaves alternate, usually entire, short petiolate; lateral nerves prominent, more or less parallel; stipules early deciduous. Flowers small, monoecious or dioecious, 5-merous, sessile or nearly so, in axillary clusters or short spikes; bracts small, scale-like. Calyx-segments valvate, persistent. Petal 5, small, alternating with calyx segments. Disk flat in male flowers with an annular rim, extra staminal in the female flowers, double, outer annular; inner corona-like, enclosing the ovary. Stamens 5, united at the base forming an androphore; anther cells parallel; pistillode 2-4-lobed or partite. Ovary 2-celled; ovules 2 in
each cell; style 2, free or sub-connate; stigma forked or sub-entire. *Fruit* drupaceous, with 1-2 single seeded pyrenes; albumen fleshy, copious; cotyledons thin; radicle superior.

Erect trees or shrubs:—

Lateral nerves many, usually 12-30 on either half:—

Flower clusters in paniculate spikes:—

Branchlets not verrucose:—

Young stem spinescent. 1. *B. retusa*.

Flowers in dense small axillary clusters:—

Fruit ellipsoid, about .25 in. long:—

Branchlets verrucose, not spinescent. 2. *B. verrucosa*.

Flowers in minute axillary clusters:—

Fruit ovoid, about 1 in. long:—

Lateral nerves slightly arching. 3. *B. assamica*.

Lateral nerves 5-12 on either half:—

Leaves hairy beneath:—

Fruit ovoid, about .5 in. long:—

Petiole .25 in. long. 4. *B. pubescens*.

Fruit globose, .1-.15 in. across:—

Petiole .12 in. long. 5. *B. tomentosa*.

Lateral nerves 6-10 on either half:—

Leaves up to 3.5 in. long. 6. *B. cuneata*.

Lateral nerves 10-15 on either half:—

Leaves up to 9.5 in. long. 7. *B. sikkimensis*.

Scandent or climbing shrubs, tomentose. 8. *B. stipularis*.


A large or medium-sized deciduous tree (60'/48''), armed with strong conical spines (up to 2 in. long), when young. *Bark* darkish-grey, rough outside, exfoliating in irregular flakes, about .5 in. thick; inside light red, finely fibrous and soft with faint streaks of lighter tissue. *Leaves* variable, 2.5-8 by 1-5 in., (occasionally up to 12'') elliptic, elliptic-lanceolate, ovate or obovate, acute or obtuse, entire or slightly crenulate, rigidly coriaceous, dark-green and glabrous above, glaucous but pubescent on the nerves beneath; lateral nerves 15-30 on either half, sub-parallel, prominent, meeting in a marginal nerve; areoles with minute dots beneath; petiole .1-.5 in. long, brown-tomentose; stipules small, deciduous, obliquely lanceolate. *Flowers* up
to 2 in. across, greenish yellow, in dense, axillary fascicles or arranged interruptedly on long, flexuous, axillary and terminal spikes which are sometimes panicled bearing both male and female flowers; bracts villous. Male flowers: calyx-segments triangular, acute; petals coarsely toothed or lobed. Female flowers: pedicels lengthening in fruit; calyx-segments triangular; outer disc annular, inner completely covering the ovary; petals oblong or ovate, entire or undulate; styles 2, free, bifid from about half way. Drupe globose, fleshy, 3-4 in. across, purplish black when fully ripe, edible, supported by the somewhat enlarged calyx.

GOALPARA, GARO HILLS, N. C. HILLS, NOWGONG, KAMRUP, DARRANG, SIBSAGAR, LAKHIMPUR, KHASI & JAIN'TIA HILLS, (upto 3,000 ft.).

Wood cream coloured to olive brown, very durable, used for house-posts and other building purposes.

Flrs. 5-6. Fr. 10-1.


A small or moderate-sized deciduous tree, often a shrub. Branchlets pustulate. Bark greyish brown. Leaves 3-9 by 1.5-4 in., rhombic-obovate, elliptic or elliptic-oblong, usually obtuse, sometimes sub-acute, entire or undulate, coriaceous, glabrous, glossy above, paler beneath; lateral nerves 9-16 on either half, somewhat arched, meeting the marginal nerve; base cuneate, rounded or narrowed; petiole 1.4 in. long, almost glabrous; stipules deciduous. Flowers greenish-yellow, in dense very small axillary clusters; bracts minute, scarious, hairy. Male flowers shorter than the females; calyx-segments oblanceolate; petals obovate, irregularly toothed or lobed. Female flowers about 1 in. across; calyx-tube hairy at the base; calyx-segments lanceolate, acuminate; petals ob lanceolate, entire; inner disc almost embracing the ovary. Fruit ovoid or ellipsoid, 25 in. across, seated on the unaltered calyx, usually black when ripe.

KHASI HILLS, DARRANG, KAMRUP. (upto 4,000 ft.)

There are specimens in the herbarium showing flowering in cold
season which is supported by Mr. P. C. Kanjilal in his Forest Flora for Pilibhit, etc.

Frs. 4-5. Fr. End of Rainy season.


A small tree; branchlets smooth, sparsely pubescent. Bark whitish, thin; blaze reddish; wood white. Leaves 3-14 by 1·3-5·5 in., elliptic or elliptic-lanceolate or elliptic-oblong, acuminate, entire or undulate, membranous but tough, glabrous, green above, pale beneath, sometimes microscopically puberulous on the nerves beneath; lateral nerves 10-20 on either half, somewhat arched; reticulation elegant; base acute or rounded; petiole 2-1 in. long; stipules subulate. Flowers sessile in minute axillary clusters, about 25 in.; bracts minute, pubescent, imbricate. Calyx-segments ovate-lanceolate. Male petals rounded, crenate. Female petals elliptic, entire; disc truncate, almost enclosing the ovary; style 2, bifid. Fruit ovoid, about 1 in. long, smooth, seated on the unaltered calyx.

SIBSAGAR, NOWGONG, SYLHET, MISHMI HILLS.

Frs. & Fr. Cold season.


A middle-sized tree (40'/30''). Bark greyish, finely fissured. 12 in. thick; reddish inside with scattered fine white fibres; base of stem or young shoot often spinous; branchlets tubercled; twigs pubescent; blaze red, giving out watery juice; wood cream-coloured or slightly yellowish. Leaves bifarious, 1·8 by 5·5 in., elliptic or obovate, undulate or repand, acuminate, membranous, glabrous or puberulous above, pubescent on the nerves beneath; lateral nerves 8-12 on either half, arching; base rounded or acute; petiole 1·3 in. long. Flowers up to 25 in. across, tomentose, in axillary clusters or spicate; bracts short. Calyx 12 in. across; segments deltoid, acuminate. Petals obovate or obcordate. Disc
prominent. *Drupe* ellipsoid or oblong, \(\cdot 5\) by \(\cdot 25\) in., red when ripe, one-seeded, seated on the calyx.

**LAKHIMPUR, NOWGONG, GOALPARA, KHASI & JAINTIA HILLS.** (upto 5,000 ft.)

Frs. 4. Fr. 8-10. (ripe fruit 12-2).


A shrub or a small tree (30'/20''); twigs rusty-tomentose. *Bark* greyish-warty, \(\cdot 12\) in. thick; inside red, fibrous. *Leaves* 1-4-5 by 5-1-5 in., lanceolate or elliptic, undulate, acute or obtuse, rarely subacuminate, membranous, glabrous or obscurely pubescent above, pale glaucous beneath, (glabrous when mature); lateral nerves 7-12 on either half; base acute or obtuse; stipules \(\cdot 1-\cdot 2\) in. long, pubescent (always). *Flowers* in axillary clusters; bracts minute, villous. *Male flowers*: shortly pedicellled; petal crenate, broader than long. *Female flowers*: shortly pedicellled; calyx about \(\cdot 11\) in. across in fruit; segments triangular; petals suborbicular, entire. *Drupe* \(\cdot 25\) in. across, blue-black. globose, seated on the calyx.

**SIBSAGAR, NOWGONG, KAMRUP, DARRANG, GOALPARA, GARO HILLS, CACHAR (N. C. HILLS) KHASI & JAINTIA HILLS.**

Frs. 9-10. Fr. 11-1.

6. **Bridelia cuneata** Gehrm.

Tree or shrub. *Leaves* 2-3-5 by 1-5-2-5 in., broadly obovate, glabrescent; secondary nerves 6-10 on either half, often pale underneath; base cuneate; petiole \(\cdot 2\) in. long, glabrescent, rugose at the base. *Flowers* in axillary glomerules, glabrous, \(\cdot 1\) in. across; peduncles \(\cdot 1-\cdot 12\) in. long.

**KHASI HILLS** (Clarke Nos. 40112, 44066, 42604) (allied to *B. Hamiltoniana*).

7. **Bridelia sikkimensis** Gehrm.

Shrub or tree. *Branches* glabriusculus, often lenticellate, verrucose. *Leaves* 2-5-9-5 by 1-5-2-8 in., obovate, apex
rotund or abruptly and shortly cuneate, often pale beneath; secondary nerves 10-15 on either half; petiole 1\(\frac{1}{2}\) in. long, glabrescent, rugose beneath. *Flowers* in axillary glomerules, glabrous. *Calyx-segments* triangular, acute. *Petal* calycine, short. *Fruit* ellipsoid, bilocular or unilocular by abortion; embryo plane, membranous.

KHASI HILLS (Hooker, Clarke). (Engler 1908 p. 34).


A large more or less scrambling or climbing shrub; branchlets pubescent or tomentose, pendent; stem woody. *Bark* whitish, thin, rough; blaze reddish. *Leaves* 1\(\frac{1}{3}-5\) by 7-3 in., (reduced in the flowering twigs) elliptic-oblong or obovate, obtuse or rounded, membranous, glabrate above, tomentose beneath; lateral nerves 8-12 on either half, arching; tertiaries conspicuous, parallel; base rounded or subcordate; petiole 1-2 in. long. *Flowers* 1\(\frac{1}{2}\) in. across, monœcious, greenish, in numerous axillary clusters, spicate or panicled; bracts broader than long, hirsute. *Calyx-segments* triangular, acute, spreading, with a few brownish spots outside. *Petals* orbicular, cuneate, usually 2 or 3-toothed. *Stamens* at first combined into a column, then branching into 5 spreading arms. *Stigma* just protruding in the centre from the extremity of the column. *Disc* flat, greenish-yellow. *Drupe* oblong, \(\frac{5}{2}\) in. long, reddish, turning blue-black when over-ripe, seated on the enlarged calyx.

Common throughout the Province (upto 1,500 ft.).

Fruits are eaten, tastes like *Emblica officinalis*. Wood is used in making stands of baskets.

Flrs. 9-11. Fr. 2-3.

4. *CLEISTANTHUS* Hk. f.

*Cleistanthus chartaceus* Muell. Arg.

A small tree (30′/20″); young parts rusty-tomentose. *Bark* cinnamon-grey, fairly smooth, 1 in. thick; inside
salmon red, finely fibrous. *Leaves* alternate, 5-8 by 1·75-2·25 in., narrow-lanceolate or elliptic-lanceolate, acuminate, entire, sub-coriaceous, glabrous, pale grey beneath; lateral nerves 6-8 on either half, sub-parallel, arching; base narrowed into the petiole or acute; petiole 2-4 in. long. *Flowers* small, monoeccious. *Male flowers*: calyx-segments 5, valvate; petals 5, short, scale-like; filaments connate below in a central column bearing the pistillode; anther-cells parallel. *Female flowers*: calyx cupular under the ovary; disk dentate. *Ovary* quite glabrous, 3-celled; styles 3, bifid. *Capsule* stipitate, 5 in. long, woody, of three 2-valved, 1-seeded cocci. *Seeds* albuminous.

KHASI & JAINTIA HILLS, SYLHET.
Frs. 3. Fr. 5.

5. ACTEPHILA Bl.


A small tree or shrub; young shoots minutely hairy. Bark grey. *Leaves* 2-9 by 8-3 in., obovate or oblanceolate or oblong-elliptic, acuminate, entire, sub-coriaceous, glabrous; lateral nerves 6-12 on either half; base cuneate or acute; petiole 2-6 in. long. *Flowers* in axillary clusters; sepals 5-6; petals small; disc 5-lobed. *Stamens* 3-6; filaments connate or free, round a 3-lobed pistillode. *Fruit* capsular, depressed, globose, 1 in. across, 3-angled, usually on a slender pedicle up to 4 in. long.

SIBSAGAR, N. C. HILLS, NOWGONG, KHASI & JAINTIA HILLS, (up to 4,000 ft.).
Frs. 9. Fr. 12-1.

6. ANDRACHNE Linn.

Herbs or undershrubs. *Leaves* usually alternate, entire, membranous. *Flowers* monoeccious, pedicelled. *Male flowers* clustered; calyx 5-6-lobed or partite; petals 5-6 or obsolete; stamens 5-6; anthers erect; cells parallel; pistillode small. *Female flowers*: calyx large; petals almost obsolete. *Ovary* 3-celled; styles 2-fid or partite. *Capsule* of 2-3-valved cocci.
Seeds curved, rugose, not strophiolate; albumen fleshy; embryo curved; cotyledons broad, flat.

Leaves oblong or elliptic-obtuse; style 3, deeply bifid. . . . . . . . 1. A. cordifolia.
Leaves lanceolate-acuminate; style 4-6 . . 2. A. emicans.

1. Andrachne cordifolia Muell. Arg.

A small shrub with slender branches; young parts hairy. Leaves 1-3 by 7-1.2 in., ovate-oblong or elliptic, obtuse, entire, thinly membranous, glabrous, pale and sparsely puberulous beneath; lateral nerves slender, almost obscure; base rounded or acute; petiole slender, 2-7 in. long. Flowers monoecious, on long filiform pedicels, 5-1.5 in. long. Calyx-segments obovate. Petals keeled; disc of 5 bifid glands. Ovary 3-celled; ovules 2 in each cell; styles 3, deeply bifid. Capsule globose, 3 in. across, slightly 3-lobed, supported by the accrescent calyx.

KHASI & JAINTIA HILLS, N. E. F. TRACT, GOALPARA.  
Flrs. 6-9. Fr. Cold season.

2. Andrachne emicans Dunn.

A small shrub; the young shoots springing up to a height of 10 feet, which is a prominent feature of the plant. Leaves 2-3.5 in. long, lanceolate-acuminate, dark green; lateral nerves 8-9 on either half; base acute; petiole slender, 4-8 in. long. Female flowers axillary, 2-4; pedicels slender, 3.4 in. long. Calyx-segments ovate-obtuse, herbaceous, 0.07 in. long. Disc glands alternate with the calyx-segments, 0.02 in. long, membranous, deeply bilobed. Ovary trilocular, 6 ovulate; style 4-6, 0.02 in. long. Capsule depressed, globose, about 0.02 in. across. Seeds 6, angulate, 0.06 in. long.

N. E. F. TRACT, (Kobo) (Burkill's Nos. 35955, 37068, 37390).  
Fr. 12.

A. Clarkei Hk. f.

A slender erect shrub 18 ft. high.  
Kohima (4,700 ft. Clarke). MANIPUR.  
(There is no specimen in Forest Herbarium, Shillong).
7. NEOPELTANDRA Gamble.

Undershrub. Leaves alternate, membranous; stipules caducous; ciliate. Flowers monœcious; male in short racemes covered with ciliate imbricating bracts; female solitary from below them, long-pedicelled. Calyx-segments 5, imbricate. Disc saucer-like, lining the inside of the calyx. Stamens 5; filaments connate below, free above; anthers 2-celled, dehiscing longitudinally. Ovary 3-celled; ovules 2 in each cell, pendulous; styles 3-fid. Capsule small, 3-celled, cocci thinly coriaceous. Seeds 2 or only 1 in each cell; testa crustaceous, prominently pitted; albumen fleshy; cotyledons flat, leafy.

Neopeltandra macropus (Hk. f.) A. Das. (Syn. Phyllanthus macropus Hk. f.)

Shrubby, quite glabrous, similar to P. longipes Muell. in habit. Leaves 3-5 in. long, ovate or oblong-lanceolate, finely acuminate, undulate, membranous; petiole 1-3 in. long. Female flowers axillary; pedicels very long. Capsule small, hairy.

(There is no specimen in Sibpur or in Forest Herbarium, Shillong).

8. PHYLLANTHUS Linn.

Herbs or shrubs, usually deciduous, sometimes with deciduous branchlets. Leaves entire, alternate, distichous. Flowers very small, monœcious, in axillary cluster or sub-solitary. Female flowers larger. Calyx-segments 5-6, imbricate in 2 series, accrescent in fruit. Petals 0. Disc in male of small glands in female of glands or annular. Stamens 3; filaments connate or free; anthers confluent or didymous, dehiscing vertically or transversely. Ovary 3-celled; styles 3, free or connate at base, 2-fid. Fruit capsular, with three thin or crustaceous 2-valved cocci. Seed trigonous, 2 in each cell, rounded at the back; albumen fleshy.

Anthers erect, acute; slits vertical; connective usually produced:—
Stamens 3:—
Sepals 5-6 in both sexes:—
Leaves 2.5-4 in. long, ovate-lanceolate, glabrous; stipules minute. . 1. *P. bæobatryoides*.

Anthers didymous or reniform; slits very short:

Stamens 3:

Sepals 5-6 in both sexes:

Flowers axillary, generally clustered on leafy branchlets:

Leaves less than 1.25 in. long, glabrous:

Stipules peltate:

Leaves elliptic-lanceolate:

Capsule about .12 in. across. 2. *P. Griffithii*.

Stipules hastate:

Leaves elliptic or elliptic-oblong:

Capsule about .25 in. across. 3. *P. parvifolius*.

Stipules broadly peltate:

Leaves coriaceous, linear-lanceolate:

Capsule .1 in. across. . 4. *P. Ræperianus*.

Stipules semi-sagittate:

Leaves obovate-oblong:

Capsule .1 in. across. . 5. *P. simplex*.

Stipules lanceolate:

Leaves elliptic-oblong, membranous:

Capsule about .09 in. across. 6. *P. Leschenaultii*.

Stipules membranous, fimbriate:

Leaves obovate or orbiculate:

Branchlets grooved:

Disc of female-flowers obscurely lobed. . . 7. *P. Clarkei*.

Leaves elliptic or obovate-oblong:

Disc of female-flowers deeply 6-lobed. . . . 8. *P. brevipes*.

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1. Phyllanthus bæobatryoides *Wall*.

A glabrous shrub; branchlets woody. *Leaves* 2.5-4 by 1-1.5 in., ovate-lanceolate or oblong-lanceolate, acute or acuminate, rather thinly coriaceous, glabrous; lateral nerves 6-8 on either half, slender; leaves sessile or almost sessile; stipules minute. *Flowers* usually clustered in slender axillary spikes or racemes, about 3 ft. long; bract minute; male flowers shortly pedicelled; sepals 5-6, orbicular; disk of 5-6 glands; female flowers subsessile, larger; sepals narrow-
er, oblong-lanceolate; disk obscure. Stamens 3, apiculate, not diverging at the apex. Ovary 3-celled, 2 ovules in each cell; style short; stigma 3, armed, blunt. Fruit capsule.

KHASI & JAIN'TIA HILLS, (16417), SYLHET (Wallich, Griffith).

Flrs. 2. Fr. Hot season.

2. Phyllanthus Griffithii Muell.

A much-branched shrub or under-shrub; branchlets angled, glabrous. Leaves subsessile, 5-8 in. long, scattered, elliptic or oblong, acute or obtuse, sub-coriaceous, glaucous beneath; lateral nerves 6-8 on either half; stipules peltate, lacerated; base acute. Flowers axillary; pedicels long. Male flowers 0.06 in. across; pedicels slender; sepals rounded; stamens recurved; anthers globose; disk of small glands. Female flowers larger; sepals oblong, reflexed in fruit; ovary globose; style arms capillary; disc annular. Capsule 0.13 in. across; depressed-globose.

Mamloo (K. & J. Hills), MANIPUR. (F.B.I. V. P. 224).


A virgate shrub 4-8 ft. high, with slender upright branches, almost glabrous, ribbed, twigs purplish. Bark pale-brownish. Leaves bifarious, 2-3 by 1-2 in., sessile, obovate or elliptic, rounded, entire, membranous, glaucous beneath; lateral nerves 4-5 on either half; stipules hastate. Flowers 1 in. across, minute, axillary, pedicelled, solitary or few together. Male flowers: calyx-segments rounded; filaments short, spreading; anthers didymous; disc glandular. Female flowers: calyx-segments oblong; disc annular; ovary globose; styles 2-partite. Capsule about 0.15 in. across, globose, obscurely 3-lobed, purplish. Seeds smooth.

KHASI & JAIN'TIA HILLS, (4-5,000 ft.).

Flrs. 6-9. Fr. Cold season.
4. **Phyllanthus Rœperianus Wall.**

A small rigid shrub; branches densely fascicled, woody; branchlets ribbed. *Leaves* dense, \( \cdot 2 \cdot 6 \) by \( \cdot 1 \cdot 2 \) in., linear, oblong-lanceolate or obovate, obtuse or acute, margin recurved, coriaceous, pale green above, glaucous beneath; lateral nerves 4-6 on either half, rather obscure; base rounded or sub-cordate; petiole \( \cdot 1 \) in. long; stipules membranous, peltate. *Flowers* dull white, arising from tufts of minute fimbriate bracts. *Male flowers* very shortly pedicelled; calyx-segments 5-6, broadly oblong, fertile. *Stamens* 3; filaments connate to the middle; anthers didymous; disc glandular. *Female flowers* larger; disc broad, 6-lobed; style reflexed, 2-partite, slender. *Capsule* \( \cdot 12 \) in. across, depressed globose, crustaceous, obscurely 3-lobed.

MANIPUR, KHASI & JAINTIA HILLS, (5-6,000 ft.) on rocks along streams.

Flrs. 3-4. Fr. 9-10.

5. **Phyllanthus simplex Retz. Vern. Bon-Baberi, Ass.**

An annular or an undershrub, about 2 ft. high, glabrous; branches somewhat flattened, ridged from the leaf bases. *Leaves* variable, distichous, almost sessile, \( \cdot 5 \cdot 1 \cdot 5 \) by \( \cdot 3 \cdot 7 \) in., linear-oblong, apiculate or rounded, entire, slightly recurved, thinly coriaceous, glabrous, glaucous beneath; lateral nerves 4-5 on either half; stipules broadly auricled or peltate. *Flowers* minute, in small clusters or solitary; pedicels slender, longer in female flowers. *Calyx-segments* 6, oblong, obtuse in female, slightly accrescent in fruit; stamens 3, free; anthers didymous. *Disc* glandular in male, auricled in female. *Ovary* minutely verrucose when young, obscurely 6-lobed; styles 2-fid; arms recurved. *Capsule* \( \cdot 1 \) in. across, globose, smooth, crustaceous. *Seeds* minutely tubercled in rows.

KAMRUP.
The leaves, flowers and fruits are used medicinally.

Flrs. & Fr. most of the year; mainly in rainy season.

6. **Phyllanthus lechenaultii Muell.**

A small shrub 2-4 ft., much branched and with numerous short fascicled deciduous branchlets. *Leaves* distichous,
5·1-2 by 3·6 in., elliptic or elliptic-oblong, obtuse or sub-acute, membranous, glabrous; lateral nerves 4-8 on either half, very slender; base rounded or acute; petiole very slender, 0·07-1 in. long; stipules about 0·4 in. long, lanceolate. Flowers minute, male and female often from the same axils; pedicels filiform, 0·16-0·25 in. long. Male-perianth of 6 nearly free petaloid segments, whitish, elliptic-oblong, acute; disc of 6 orbicular glands; anthers terminal, didymous; cells confluent. Female perianth similar to male; disc annular, fleshy, lobed or crenate; style 3, spreading, dividing into 2 linear lobes. Capsule 0·12 in. across, sub-globose.

KHASI HILLS, (2·5,000 ft.).
Flrs. & Fr. 6-8. (Haines).


A rigid small shrub 2-3 ft. high, woody; branchlets grooved, scaberulous, stiff, erect. Leaves 2·5 by 1·2 in., obovate, rounded or acute, margins recurved, rather thinly coriaceous, green above, paler beneath; lateral nerves 3-4 on either half, very slender, rather obscure; base narrowed into the short petiole which is 0·1 in. long; stipules fimbriate, membranous, Flowers sub-solitary; pedicels filiform, about 0·3 in. long; calyx-segments broadly oblong; disc of male glandular, that of female cupular, obscurely lobed; filaments short, recurved; anthers didymous. Ovary globose; style free, reflexed. Capsule globose, reddish, about 0·12 in. across, obscurely 6-lobed, smooth.

N. E. F. TRACT, KHASI HILLS, (6,000 ft.). Along streams.
Flrs. & Fr. 10-1.

8. Phyllanthus brevipes Hk. f.

Shrubby, about 18 in. high, quite glabrous; branches rigid. Bark greyish-brown. Leaves 3·9 by 2·4 in., elliptic, obovate or oblong, obtuse or subacute, entire, thinly coriaceous; lateral nerves 4-6 on either half, very slender; base cuneate or acute; petiole very short, 0·05-0·1 in. long. Flowers arising from tufts of fimbriate bracts. Male flowers ochre-
green; sepals broadly obovate; disc of orbicular glands; filaments connate at base; anthers didymous. Female flowers green; sepals narrower; disc deeply lobed; style reflexed, 2-lobed. Capsule sub-globose, 3-lobed, \(0.05-0.8\) in. across.

N. E. F. TRACT (Burkill's No. 37,147) MISHMI HILLS. (Griffith 4,821).
Frs. 12.

P. nanus Hk. f.
A rigid perennial, rather woody, glabrous. Leaves \(1-4\) by \(1\) in., sub-sessile, linear, obovate-oblong, obtuse; margins recurved, coriaceous. Flowers minute. Calyx segments ovate. Capsule globose.
Laitlyngkot—KHASI HILLS, 6,000 ft. (Sister Dagmar No. 7741).
Frs. & Fr. 9.

P. urinaria Linn.
An annual herb (rarely perennial); branchlets angled. Leaves sessile, \(16-6\) in. long, very variable, oblong or linear-oblong, apiculate or rounded, glaucous beneath; stipule peltate. Flowers minute, axillary; sepals ciliolate. Filaments short, free. Ovary granulate. Fruit \(1\) in. across, echinate.

ASSAM.
Var. Hookeri.—Taller and larger; stem and branches terete.
KHASI & JAINTE HILLS, \(2-4,000\) ft.). (Griffith).

P. debilis Ham.
Rather an undershrub. Leaves \(3-5\) by \(2-3\) in., obovate, membranous. Anther didymous. Styles short; arms reflexed, recurved. Capsule very small; seeds ribbed.

KHASI & JAINTE HILLS (Umsaw).
Frs. 7.

9. REIDIA Wight.

Herbs, shrubs or undershrubs. Leaves alternate, various, usually membranous; stipules small. Flowers monoeious in fascicles; male short, pedicelled; female long pedicelled. Calyx-segments 4 in male, 6 in female, persistent. Corolla obsolete. Disc 4-glandular in male and 6-glandular in female. Stamens 2-4; the filaments united in a column round the pistillode; anthers dehiscing horizontally. Ovary 3-celled; ovules 2 in each cell; style 3, 2-fid or 2-partite.
Capsule of 3 thinly crustaceous 2-valved cocci. Seeds triangular; cotyledons oblong.

Leaves up to 1·5 in. long, elliptic or broadly ovate:—

Calyx of male and female flowers fimbriate:—

Fruit ·16 in. across, depressed. ... 1. R. Hamiltoniana.

Leaves up to 3·5 in. long, lanceolate:—

Calyx of male pectinately fimbriate, of female serrate:—

Fruit ·25 in. across; globose. ... 2. R. tetrandra.


A small shrub, bushy; branchlets puberulous, slender, purplish-brown. Leaves ·8-2 by ·4-1 in., elliptic-obovate or ovate, obtuse or acute, membranous, green above, pale beneath, glabrous; lateral nerves 6-8 on either half, very slender, rather obscure; base usually rounded; petiole ·05-1 in. long; stipules ovate, caducous. Male flowers in axillary fascicles; pedicels capillary, about ·5 in. long. Female flowers axillary, solitary or in terminal lax racemes; pedicels capillary, about 1 in. long; calyx-segments pubescent without, male 4, female 6, more or less toothed; male disc dilated, 4-lobed; female disc saucer-shaped. Ovary 4-celled; style 4, erect. Fruit globose, scabrid, ·16 in. across.

KAMRUP (supposed to occur in NOWGONG, GOALPARA and KHASI HILLS).

Flrs. & Fr. 4-5.

2. Reidia tetrandra (Roxb) A Das Comb. (Syn. Phyllanthus Roxburghii Muell).

Shrubby; branches slender, terete, rusty-pubescent. Leaves 2-3·5 by ·9-1·5 in., often inequilateral, lanceolate, acute or bluntly acuminate, entire, membranous glabrous; lateral nerves 6-10 on either half, very slender; base rounded or obtuse; petiole ·07-1 in. long; stipules caducous, subu-
late. *Flowers* red, densely fascicled; pedicels up to 0.5 in. long, very slender or capillary. *Male* perianth segments pectinately fimbriate; disc glands 2-lobed. *Ovary* smooth. *Fruit* deeply 3-lobed, 0.25 in. across; cocci thinly crustaceous.

**SYLHET.**

**10. PROSORUS** Dalz.

Trees. *Leaves* alternate, deciduous. *Flowers* dioecious; male monœcious in axillary fascicles, with capillary pedicels; female solitary or few together, axillary, with stouter and longer pedicels. *Calyx-segments* 4. *Disc* annular, fleshy. *Stamens* 4; filaments free; anthers extrorse; cells dehiscing longitudinally. *Ovary* 3-celled; ovarules 2 in each cell; style shortly bifid. *Capsule* globose; epicarp thin; seeds 6, irregularly trigonous, arillate; albumen coarse; cotyledons small, flat.


A large or moderate sized tree (60'/53''). *Bark* greyish-brown, smooth, exfoliating in large papery flakes, 0.25 in. thick, pinkish inside, soft; branchlets purplish brown. *Leaves* distichous, 2-6 by 1.5-3 in., elliptic or oblong-elliptic, acute or rounded, usually entire, thinly coriaceous, glabrous; lateral nerves 8-12 on either half; base rounded or acute; petiole 2-3 in. long; stipules lanceolate, serrate. *Male flowers* in axillary fascicles; pedicels capillary, short: calyx-segments 4-5; stamens 4; filaments free; anthers adnate; disc large, annular, fleshy. *Female flowers* axillary, solitary or fascicled; pedicels 5-8 in. long, stouter than male; disc small, narrow; ovary 3-celled; ovarules 2 in each cell; style bifid with recurved lobes. *Fruit* spherical, depressed, 0.4 in. across, purplish brown, rugose, smooth, obscurely 6-lobed, cocci white. *Seeds* obscurely trigonous, deeply purplish-blue.
LAKHIMPUR, SIBSAGAR, NOWGONG, N. E. F. TRACT, CACHAR, SYLHET.

Flrs. 4-5. Fr. Cold season.

11. FLUEGGEOPSIS K. Schum.

Shrub. Leaves distichous, shortly petioled. Flowers dicæous, pedicelled. Calyx-segments of male and female 5-6, broadly oblong. Disk of male consisting of a globose gland, of female consisting of an obscure ring. Stamens 5; filaments free; anthers erect; slits vertical; connectives not produced. Ovary 3-celled, ovoid; styles 3, slender, entire, united at the base. Fruit a 3-seeded berry; testa crustaceous.

Flueggeopsis glauca (Wall) A. Das, n. comb. (Syn. Phyllanthus glaucus Wall) Vern Dieng soh-matan Kh.

A shrub, quite glabrous; branches divaricate; branchlets slender. Bark greyish, rather rough, green below the cuticle; blaze whitish. Leaves 5-2 by 3-1 in., elliptic or oblong, acute, obtuse or shortly acuminate, membraneous, glaucous beneath; lateral nerves 5-10 on either half; base acute; petiole 0.05-1 in. long. Flowers yellowish, about 1 in. across, axillary, solitary or fascicled. Male flowers: calyx-segments lanceolate. Stamens 5, free. Female flowers: pedicel clavate, 2-4 in. long. Fruit globose, purplish, 2-4 in. across, covered with the persistent style.

KHASI HILLS (4-5,000 ft.).

Flrs. 4. Fr. 6-7.

12. KIRGANELIA Baill.

Shrubs, straggling. Leaves alternate; stipules lanceolate. Flowers monœcious, in axillary clusters (male and female mixed). Calyx segments 5, imbricate, the 3 inner often the larger. Petals obsolete. Disk of 5 fleshy glands. Stamens 5 in 2 series, the outer free, the inner connate; anthers dehiscing longitudinally. Ovary 5-12 celled; ovules 2 in each cell, superposed; albumen fleshy; cotyledons flat, truncate.
Kirganelia reticulata (Poir) Baill. (Syn. Phyllanthus reticulatus Poir).

A large straggling or scrambling shrub; branches slender, pendent, lenticellate; stem often spinescent. Bark greyish; purplish on old stem, warty, sometimes reticulately fissured; blaze reddish. Leaves distichous, 5-2 by 3-1 in., ovate-oblong or elliptic, rounded, obtuse or acute, entire, membranous, glabrous, dark green above, pale and canescent beneath; lateral nerves 6-10 on either half, slender, arching; base rounded or sub-cordate; petiole 0.05-0.15 in. long; stipules hard, brown. Flowers axillary, solitary or in few-flowered fascicles. Calyx-segments ovate, membranous, 5-6 in both sexes. Disc glandular. Stamens 5, 3 inner longer, connate; anthers erect; slit vertical. Ovary globose, 4-8 celled; ovules 2 in each cell, superposed; style minute, bifid. Berry purplish, 12-16 in. across, rather depressed. Seeds triquetrous; testa crustaceous, granulate.

DARRANG, GOALPARA, CARO HILLS, KHASI & JAINTIA HILLS (5,000 ft.).

Firs. 12-3. Fr. 3-6.

13. EMBLICA Gærtn.

Trees; branchlets distichous. Leaves small, pinnately arranged on the branchlets; stipules scarious, minute. Flowers monoeious, axillary, fascicled, male and female mixed or frequently male in upper and female in lower axils. Calyx-segments 5-6. Stamens 3; filaments connate in a column, anthers cohering by the connective, ending in an apiculus; cells dehiscing longitudinally. Ovary 3-celled; ovules 2 in each cell; styles connate at base with recurved twice branched arms. Fruit globose, fleshy, with 3 bony 2-valved cocci. Seeds trigonous; albumen fleshy; cotyledons flat, broad, cordate or truncate.


A small to medium sized tree, deciduous; branchlets feathery with distichous leaves, resembling a pinnate leaf.
**Bark** greyish or light brownish, exfoliating in irregular plates; blaze pinkish brown to reddish, green at the edge, 25-5 in. thick. **Leaves** 2-5 by 1-15 in., subsessile, paler beneath, glabrous; stipules minute, scarious, deciduous. **Flowers** yellowish, monoecious in axillary clusters, usually crowded towards the lower naked portion of the branchlets. **Male flowers** : perianth 6, imbricate, ovate-oblong; pedicels unto 15 in. long; stamens 3, joined in a short column; anthers longitudinally dehiscent; disk obscure or of glands. **Female flowers** subsessile; perianth similar to male flowers; disk cupular, irregularly toothed; ovary 3-celled; ovules 2 in each cell; styles bifid, spreading. **Fruit** a drupe, globose, 5-8 in. across, obscurely 6-lobed, yellowish on ripening, stone splitting into 2-seeded bony cocci when dry; seeds trigonous.

All over the Province, sometimes cultivated (Fruit is often larger in cultivation).

The fruit is edible and made into chutney or preserved with sugar. The bark and fruit are used for tanning. "This Emblic Myrobolan is an important article in Hindu Materia Medica." "A fermented liquor prepared from the fruit is used in jaundice, dyspepsia, cough, etc."


**Flrs.** 3-5. **Fr.** Cold season.

**14. FLUEGGEA** Willd.


A large unarmed shrub or small tree; branches straggling, angular. **Bark** reddish brown, exfoliating in thin strip, 1-12 in. thick; inside reddish. **Leaves** deciduous, alternate, distichous, 1-4 by 5-2-5 in., elliptic-ovate, obovate or suborbicular, acute or obtuse, rarely acuminate, entire or retuse, membranous but tough; lateral nerves 5-8 on either half, slender; petiole 1-4 in. long. **Flowers** dioecious, minute, pedicellate, axillary. **Male flowers** in clusters; calyx-segments 5, imbricate, petaloid; petals 0; disc of 5 or less glands,
alternate with the stamens; stamens 5, rarely less; filaments free, exserted; pistillode 2-3 fidi. **Female flowers** sub-solitary; disc annular, toothed; ovary 1-3-celled; styles free, recurved, usually bifid. **Fruits** of 2 sizes mostly small and dry, but some large, white, fleshy, 3 in across. **Seeds** triquetrous, minutely punctate; albumen scanty; embryo curved; cotyledons flat.

Fairly common throughout the province (up to 5,000 ft.).

**NAGA HILLS, KHASI & JAINTIA HILLS.**

Wood reddish, white, closed grained and durable. Used for agricultural implements.

Flrs. 4-5. Fr. 9-11.

15. **BACCAUREA** Lour.


A middle-sized tree (35'/48''); young parts hairy. **Bark** darkish grey, with vertical lenticels, exfoliating in pieces, 3 in. thick; blaze brownish; wood cream coloured. **Leaves** 4-9 by 1·3-3·5 in., elliptic-oblong or obovate or elliptic-lanceolate, acuminate, membranous, glabrous; lateral nerves 5-10 on either half; base narrowed; petiole 5·1-7·5 in., thick, geniculate. **Flowers** dioecious, apetalous, shortly pedicellate, in densely fascicled racemes from old wood or below the leaves. **Male bracts** longer than the clusters. **Female bracts** very small. **Calyx-segments** 4-5, unequal. **Stamens** 4-8; filaments short, free; anthers small; pistillode pubescent; disc 0. **Ovary** 2-5-celled, tomentose; stigma small, 2-5; ovules 2 in each cell. **Fruit** globose, capsular, yellowish-brown, about 1 in. across; endocarp not separable. **Seeds** orbicular, embedded in rose-coloured pulp (arillus).

Common throughout the province.

The pulp is edible and delicious.

Flrs. 4-5. Fr. 5-7.
16. **APOROSA** Blume.

Trees, usually evergreen. *Leaves* alternate, entire, rarely sinuate-toothed, coriaceous; stipules small, rarely large, foliaceous. *Flowers* usually dioecious, apetalous, male minute in axillary catkin-like spikes, solitary or clustered; female in short bracteate spikes; bracts concave, imbricating. *Male flowers*: calyx-segments usually 4, (sometimes 3-6) imbricate, membranous; disk obsolete; stamens 1-5, central; filaments capillary; anthers didymous; pistillode minute or 0. *Female flowers*: sepals longer; ovary 2, rarely 3-celled; ovules 2 in each cell; stigmas small, short, plumose, simple or 2-4 cleft, spreading and recurved, rarely elongate and 2-partite. *Fruit* capsular, ovoid, ellipsoid or globose, bursting irregularly or partially, 2-4-valved from the base; epicarp thin or thick, spongy or fleshy. *Seeds* oblong or sub-orbicular; albumen fleshy; cotyledons flat, broad.

Ovary more or less hairy:—
Fruit ovoid-oblong, nearly glabrous:—
*Leaves* elliptic or elliptic-lanceolate, acuminate. . . . . . . . 1. *A. Roxburghii*.
Fruit ellipsoid, base hairy:—
*Leaves* elliptic-oblong, obtuse or sub-acute. 2. *A. oblonga*.

Ovary glabrous:—
Fruit ellipsoid, beaked, about .5 in. long.
cells of fruit very hairy within:—
Male bracts tomentose:—
*Leaves* dark-green. . . . . . . 3. *A. Wallichii*.
Fruit globose, .5 in. across, cells of fruit glabrous within:—
Male bracts glabrous:—
*Leaves* pale green. . . . . . . 4. *A. aurea*.


An evergreen tree (35'/30''), almost glabrous (except inflorescence and tips of twigs). *Bark* greyish-brown, reticulately fissured, ·12·16 in. thick; inside reddish with brown streaks, finely fibrous; wood cream coloured. *Leaves*
2·5-6·5 by ·8-3 in., elliptic or elliptic-lanceolate, sometimes elliptic-oblong, acuminate, rarely obtuse, entire, sinuate-toothed or obscurely crenate, chartaceous, glabrous, sometimes hairy on the nerves beneath; lateral nerves 5-8 on either half; base rounded, cuneate or narrowed into the petiole; petiole ·3·6 in. long. Male spikes often up to 2 in. long, often clustered; bracts broad, ciliate. Calyx-segments pubescent. Ovary thinly hairy; stigma short, bifid. Fruit almost glabrous or sparsely hairy, usually ovoid-oblong with taper or beak at the end, (·3·5 in. long), arillate; aril reddish, acid; pericarp thin; septum hairy.

Common throughout the province. Fruit is eaten. Infusion of the leaves is used to dye cloth black. Wood is hard, durable and is used for house posts.

Flrs. Cold Season. Fr. 4-5.


A tree, glabrous. Bark grey, corky outside, with deep longitudinal furrows, ·25 in. thick; inside brownish, fibrous. Leaves 3·5-6 by 8·2-2 in., often slightly inequilateral, elliptic-oblong, sometimes ovate-oblong, usually obtuse, entire, coriaceous; lateral nerves 6-8 on either half; base rounded or acute, sometimes sub-cordate; petiole ·3·7 in. long. Male spikes axillary, usually solitary, up to 2·5 in. long. Female spikes very short, rusty-pubescent; bracts glabrous, ciliate. Ovary glabrous; stigmas cleft, deeply recurved, plumose. Fruit ellipsoid, about ·5 by ·3 in., beaked; rusty-pubescent at base.

CACHAR, GARO HILLS, KHASI & JAINTIA HILLS. (up to 3,000 ft.). Used for house posts.

Flrs. 1. Fr. 3-5.


A large tree. glabrous. Bark grey, smooth. Leaves 2·5-6 by ·6-1·5 in., lanceolate or narrow oblong-lanceolate,
bluntly acuminate, entire, coriaceous, glabrous, dark green; lateral nerves 5-7 on either half, slender; base acute or rounded; petiole 2-7 in. long. **Male spikes** about 1.5 in. long; sepal 4; stamens 2; bracts tomentose. **Ovary** fusiform, glabrous; stigmas 2-cleft, plumose. **Fruit** ellipsoid, 5 in. long, beaked; cells of fruit very hairy within.

**SIBSAGAR, NOWGONG, GARO HILLS.**

Frs. 3. Fr. Early rains.


An evergreen tree, glabrous. **Bark** brown, rough, 12 in. thick; inside reddish, coarsely fibrous. **Leaves** 3-7 by 1-2 in., elliptic-oblong or elliptic-lanceolate, bluntly acuminate, entire, coriaceous, glabrous, pale green (yellowish-green when dry); lateral nerves 5-8 on either half; base acute or rounded; petiole 3-1 in. long. **Male spikes** about 1.5 in. long; usually clustered; male bracts glabrous. **Female spikes** short; anthers exserted. **Ovary** flask-shaped, glabrous; styles long, 2-cleft, fringed. **Fruit** globose, 5 in. across, glabrous; cells of fruit glabrous within.

**GARO HILLS, KHASI & JANTIA HILLS, KAMRUP.** (up to 4,000 ft.).

Timber used for house posts. Decoction of leaves is used as a yellow dye.

Frs. 11. Fr. 1.

17. **ANTIDESMA** Linn.

Trees or shrubs. **Leaves** alternate, entire, stipulate. **Flowers** bracteate, dioecious, apetalous, in slender lateral or terminal, simple or panicked spikes or racemes. **Calyx-segments** 3-5 (rarely more). **Male flowers** lobed or partite; disc entire, stamens 2-5, inserted on or around the disc; filaments inflexed in bud; anther semi-linear or didymous; cell globose; connective thickened; pistillode glabrous or hairy, clavate or globose, minute or 0. **Female flowers** disc annular or pulvinate; ovary 1-celled; ovules paired; stigma 2-4, 2-fid or 2-partite. **Fruit** a compressed drupe, crowned
with the persistent stigmas. Seeds small; albumen fleshy; cotyledons broad, flat.

Ovary pubescent:—
Leaves 1·5-3 in. long:—
Stamens 4-7. 1. A. Ghesaembilla.
Ovary tomentose:—
Leaves 5-9 in. long:—
Stamens 3-4. 2. A. Roxburghii.
Ovary glabrous:—
Male flowers sessile:—
Calyx cupular, very shortly 4-lobed.
Leaves 2-6 in. long, glabrous:—
Stamens 3. 3. A. Bunius.
Calyx 4-partite:—
Leaves 3·5-7 in. :—
Stamens 4. 4. A. nigricans.
Male flowers pedicelled:—
Calyx obtuse, 4-lobed, female calyx deeply 4-lobed:—
Leaves 1-5 in. long:—
Stamens 2 (very rarely 3). 5. A. diandrum.
Calyx segments broadly ovate, 4:—
Leaves 3-10 in. :—
Stamens 3-4. 6. A. acuminatum.
Calyx cupular, shortly 3-4-lobed:—
Leaves 2-7 in. :—
Stamens 2-4. 7. A. khasianum.
Calyx 3-4-partite:—
Leaves 3·5-8 in. :—
Stamens 3-4. 8. A. Menasu.
Calyx cupular, unequally 4-lobed:—
Leaves 1·5-4 in. :—
Stamens 3-4 in. 9. A. Wattii.


A small deciduous tree or shrub; young shoots rusty or brown tomentose; branchlets lenticellate. Bark light brown furrowed, somewhat corky. Leaves 1·5-3 by 1-2 in., ovate, oblong, broadly elliptic or suborbicular, rounded or obtuse, bluntly or shortly acuminate, entire, coriaceous, glabrescent or pubescent along the nerves above, pubescent or tomentose beneath; lateral nerves 5-7 on either half,
arching, sub-parallel; base rounded, truncate or sub-cordate; petiole 1-5 in. long; stipules caducous, linear-lanceolate, tomentose. Flowers minute, in densely pubescent terminal and axillary much branched spikes. Male flowers sessile, yellowish-green; segments ovate, 5-7-partite, densely woolly tomentose; stamens 4-7; disc 5-partite, pubescent, minute. Female flowers sub-sessile; disc annular, pilose; ovary densely pubescent; stigmas recurved. Drupe sub-globose, about 2 in. long, red, ultimately purplish, black when ripe.

GOALPARA, KAMRUP, NOWGONG, SIBSAGAR, SYLHET, CACHAR, KHASI & JAITIA HILLS, (up to 2,800 ft.).
Fruits are edible.

Flrs. 3-5. Fr. Cold season.

2. **Antidesma Roxburghii** Wall.
A shrub; young branches densely rusty-villous. Leaves 4-9 by 2-3 in., obovate or oblong, elliptic-acuminate, entire, sub-coriaceous, puberulous above, villous tomentose beneath; lateral nerves 8-10 on either half; base rounded, often unequal; petiole 0.05-0.15 in.; stipules persistent. Flowers sessile in stout spikes, 4-6 in. long. Calyx 3-4 partite, villous; segments rounded. Stamens 3-4; disc glabrous; pistillode sub-globose. Female flowers-disc hairy; ovary tomentose. Fruit about 25 in. long, ovoid or ellipsoid.

SIBSAGAR, SYLHET.
Flrs. 4-5. Fr. Cold season.

A small evergreen tree (30′/36″); young parts hairy. Bark dark-brown, 16 in. thick; fibrous and pinkish-brown inside. Leaves 2-7 by 1-2.5 in., oblong-lanceolate, lanceolate, oblanceolate or oblong-elliptic, shortly acuminate, obtuse, often mucronate, entire, coriaceous, glossy green, glabrescent; lateral nerves 5-10 on either half, arcuate; petiole 1-4 in. long, pubescent; stipules caducous, reddish.
Flowers about 1 in. across, in simple or racemose pubescent spikes; bracts minute. Male flowers-calyx cupular, shortly toothed, sparsely pubescent; disc glabrous, fleshy; stamens 3; pistillode dilated at the top. Female flowers-calyx truncate or sub-entire, persistent in fruit; disc cupular, glabrous; ovary glabrous; stigmas 3-4, small. Fruit 25 in. long, ellipsoid, compressed, red, ultimately blackish; (pedicelled up to 2 in. long).


Fruits are edible.

Flrs. 4-5. Fr. 7-8.

4. **Antidesma nigricans** Tulasne.

A shrub; branches tomentose. Bark brown. Leaves 3.5-7 by 1.2-5 in., elliptic-lanceolate or oblong-lanceolate, acuminate, entire, sub-coriaceous, glabrous, the midrib above and nerves beneath pubescent; lateral nerves 6-12 on either half, arcuate, joined by intramarginal nerve; base obtuse. sometimes unequal; petiole 0.05-0.2 in. long, tomentose. Male flowers sessile. Calyx 4-partite. Disc glabrous, hemispheric. Stamens 4, inserted on the disc. Ovary glabrous; disc glabrous; stigma terminal. Fruits ovoid, 0.16 in. across.

Sibsagar, Sylhet.

Flrs. 4. Fr. 11.


A deciduous shrub or small tree; branches spreading; young parts rusty-pubescent. Bark greyish brown, thin, rough; blaze light red. Leaves (turning deep red before falling) 1.5 by 5-1.5 in., variable, oblong to lanceolate, ovate or obovate, acute or acuminate, entire, sub-coriaceous, glabrous and shining above, rusty-pubescent along the nerves beneath; lateral nerves 3-8 on either half, slender; base
cuneate or acute; petiole 0.05-0.15 in. long, pubescent; stipules lanceolate, deciduous. Flowers minute, dioecious, greenish-yellow, in slender lax terminal or lateral glabrous racemes; all flowers pedicelled. Male flowers-calyx obtuse, 4-lobed or obscurely 4-toothed; stamens 2 (rarely 3) at the base of the glabrous disc; pistillode 0. Female flowers-calyx more deeply lobed than the males; disc annular. Ovary glabrous; style terminal. Fruit about 0.16-0.2 in. across, smooth, purplish red when ripe, ovoid, acute.

Common throughout the province. Ascending upto 4,500 ft. Wood 41 lbs. per c. ft. pinkish red or cream coloured, hard, close grained. The acid leaves are eaten and made into preserve. Fruits are acid, edible.

Flrs. 4-6. Fr. Cold season.


A shrub or a small tree; branchlets tomentose. Leaves bifarious, 2-5-9 by 1-3 in., elliptic-lanceolate or oblong-lanceolate, caudate-acuminate, entire, thinly coriaceous, almost glabrous except the midrib and nerves beneath; lateral nerves 6-11 on either half, slender, arching; base rounded or obtuse, sometimes unequal-sided; petiole 1-3 in. long. Male flowers in panicked hairy racemes; sepals 3-4; disc fleshy, glabrous; stamens 3-4; pistillode conspicuous. Female flowers in much larger panicked racemes; ovary glabrous. Fruit 0.16 in. long, red when ripe, ultimately blackish, ellipsoid, acuminate, crowned by the style.

LAKHIMPUR, NOWGONG, SYLHET, SIBSAGAR, KHASI & JAINTIA HILLS, (upto 4,000 ft.).
Fruits are edible.

Flrs. 6-7. Fr. Cold season.


A shrub or a small tree; young shoots sparsely pubescent; branchlets greyish-white. Leaves bifarious, 2-6 by 1-2.5 in., oblong-elliptic, elliptic-lanceolate or narrow-lanceolate, acuminate, entire, sub-coriaceous, dark green
above, midrib and nerves sparingly pubescent when young, otherwise glabrous; lateral nerves 6-10 on either half; slender, arched; base cuneate or acute; stipule linear-lanceolate; petiole 1-3 in. long. Male racemes slender, pubescent, up to 2 in. long; flowers pedicelled; calyx cupular, shortly 3-4 lobed; stamens 2-4, inserted on the disc. Female racemes much stouter. Fruit sub-globose or ellipsoid, 25-3 by 12-16 in., red, ultimately blackish, crowned with remains of the style; stone strongly reticulated.

LAKHIMPUR, SYLHET, KHASI & JAIINTIA HILLS (up to 4,700 ft.).

Fruits are edible.

Frs. 7. Fr. 10-11.


A small or middle-sized tree; branchlets, stipules, and inflorescence velvety-tomentose; branchlets lenticellate. Leaves 3-5-8 by 1-2-2.5 in., elliptic-oblong or elliptic-lanceolate, acuminate, entire, sub-coriaceous, glabrous except the midrib, shining on both sides, paler beneath; lateral nerves 6-10 on either half, arched; base rounded or acute; petiole 0.05-2 in. long; stipules linear-lanceolate. Flowers in axillary and terminal racemes, often panicled; all flowers with stout short pedicels; bracts very small, acute, setaceous. Male flowers-calx cupular, 3-4-partite; lobes rounded; stamens 3-4, united between the lobes of the glabrous disc. Female flowers-calx minute, cupular; ovary glabrous; stigma 3-5. Fruit ovoid or ellipsoid, acute, 12-16 in. long, crowned with the stigma.

Three sheets of Antidesma Menasu were collected by G. Mann, but there is no record of time and place.

Frs. 5-6. Fr. Cold season.

9. Antidesma Wattii Hk. f.

A rigid shrub, woody; scarcely more than 6 ft. high on rocks near streams; branches densely leafy. Bark ashy grey. Leaves 1.5-4 by 2-5 in., linear-lanceolate, acuminate, margins recurved, slightly coriaceous, glossy green above,
paler beneath, glabrous except the midrib above; lateral nerves 5-10 on either half, ascending, very slender; base cuneate; petiole 0.05 in. long; stipules small, subulate. Flowers pedicelled in racemes. Male flowers minute; calyx cupular, 4-lobed; stamens 3-4 on the glabrous, deeply lobed small disc. Fruit ovoid or ellipsoid (hardly compressed) tipped with the style; stone slightly compressed.

MANIPUR (Wall), LUSHAI HILLS, (Kanjilal's No. 4755).
Flrs. Hot season. Fr. 11.

18. DAPHNPHYLLUM Blume.

Evergreen trees, glabrous. Leaves alternate, long-petiolate, entire, penninerved, approximate at the ends of branchlets. Flowers dioecious, apetalous, in axillary racemes. Male flowers-perianth segments 3-8, small, more or less connate; stamens 5-18; anthers large, basifixed, often apiculate; pistillode absent. Female flowers-perianth as in male; disc obsolete or of 4-6 scales or glands. Ovary imperfectly 2-celled; stigmas short, distinct, thick, recurved, entire; ovules 2 in each cell. Drupe oblong, usually 1-seeded. Seed with a membranous testa; albumen fleshy; embryo small.

Calyx obsolete:
Leaves papillose underneath:
   Lateral nerves 8-13 on either half:
      Stamens 5.
   Leaves not at all papillose:
      Lateral nerves 12-16 on either half:
      Stamens 9-10.


A small tree (40'35''). Bark greyish, smooth, but often with blackish warts and faint horizontal wrinkles, 2-3 in. thick; inside dun-brown, speckled, turning chocolate brown or light red: “Wood greyish-brown with streaks of bright crimson”. Leaves 4-8 by 1-2 in., oblanceolate or oblong-lanceolate, acute or acuminate, entire, coriaceous, glabrous and shining above, lateral nerves 8-13 on either half; petiole 1-2 in. long. Flowers dioecious, in
axillary racemes, 3-4 in. long. **Stamens** 5; anthers apiculate. **Ovary** imperfectly 2-celled; 2-ovules in each cell; stigma short. **Drupe** oblong, ellipsoid, \( \cdot5\cdot6 \) by \( \cdot2\cdot3 \) in.

**KHASI HILLS**, (upto 5,500 ft.).

**Flrs.** 3-4. **Fr.** 7-9.

### 2. Daphniphyllum chartaceum Roenth.

A small tree. **Branches** closely lenticellate towards the apex. **Leaves** 5-8 by 1-1.5 in., oblong, elliptic, acute, chartaceous, shining beneath; lateral nerves 12-16 on either half; base acute or sub-acute; petiole \( \cdot8\cdot1\cdot6 \) in. long. **Male** raceme \( \cdot6\cdot1 \) in. long; pedicel \( \cdot12\cdot17 \) in. long; calyx obsolete; stamens 9-10. **Female flowers** not seen. **Fruit** \( \cdot4\cdot52 \) in. long, ellipsoid; pedicel of fruit \( \cdot3\cdot4 \) in. long.

**KHASI HILLS** (Hooker) ASSAM (King's collection).

, (K. Rosenthal in *Pflanzenreich IV 147 A 1919*).

### 19. SAUROPUS Blume.

Shrubs or undershrubs. **Leaves** alternate, distichous, membranous, quite entire; stipules minute. **Flowers** monœcious, apetalous, minute, pedicelled, axillary, clustered or solitary. **Male flowers**-calyx disciform, lanceolate or turbinate; segments 6; bases with thickened folds, sometimes reflexed; disk 0; stamens 3; filaments united into a trigonous column; anthers sessile on the angles; cells linear or sub-globose, parallel. extrorse; pistillode 0. **Female flowers**-calyx large, persistent, accrescent; segments 6, disc 0. **Ovary** ovoid or globose, 3-celled, rounded or concave at the apex; ovules 2 in each cell; style 3, very short, spreading, 2-fid or 2-partite. **Fruit** globose or depressed, fleshy or coriaceous, 6-valved or breaking up irregularly with 6 trigonous crustaceous or bony coci; albumen fleshy; embryo straight or nearly so; cotyledons flat, broad.

**Style** apical or sub-apical :—

Leaves penninerved :—

Branchlets angular :—

Leaves ovate-oblong :—

Calyx disciform, 6-fid; segments spreading. \( \ldots \) \( \ldots \) \( \ldots \) \( 1. \) *S. androgynus*. 

A small shrub, quite glabrous; branchlets angular. *Leaves* 1·5-4 by 5-2 in., ovate-oblong or ovate-lanceolate, acute or obtuse, entire, membranous, glabrous; glaucous beneath; lateral nerves 4-5 on either half, very slender; base truncate or rounded; petiole 1-12 in. long; stipules persistent. *Male flowers* reddish-green; pedicels very slender; calyx disciform; segments 6. *Female flowers* pedicels 5-9 in.; calyx-segments broad, obovate-obtuse. *Fruit* globose, 5-75 in. across, fleshy, white, tinged with rose, bursting irregularly, supported on the somewhat enlarged calyx; cocci 25 in. long, with vertical hollow.

SIBSAGAR, SYLHET, CACHAR, KHASI HILLS, (Tharia East), N. E. F. TRACT (Balek). (Burkill's No. 36431).

Flrs. 9. Fr 11-1.

2. **Sauropus oblongifolius** Hk. f.

Quite glabrous. *Leaves* 2-3·5 by 6-1 in., ovate-lanceolate, acuminate; base rounded or cuneate; petiole 1 in. long. *Calyx* 5-partite; lobes narrow. *Fruit* globose, 3 in. across, splitting into 6 valves.

UPPER ASSAM, MISHMI HILLS (Griffith) (Kew distribution 4824. F.B.I., V., p. 338).
3. Sauropus lanceolatus Hk. f.

Quite glabrous; branches terete. Leaves 3-4·5 by 1 in., lanceolate, acuminate; base cuneate or rounded. Calyx-segments 6, oblong, obovate. Fruit globose, sessile, ·3 in. across, smooth, bursting irregularly; epicarp thinly crustaceous; cocci ·25 in. long, with a small basal vertical perforation.


A shrub or a small tree with simple stem and thin spreading branches. Leaves 3-9 by 1·5-3 in., ovate-lanceolate, acuminate, entire, thinly coriaceous, glabrous; lateral nerves 7-12 on either half; base cuneate or acute; petiole ·1 in. long. Flowers in long peduncles, brick red, solitary or fascicled at axils of leaves. Male flowers—pedicels filiform, ·5 in. long; calyx-segments almost free, oblong, obtuse, glabrous. Female flowers—calyx deeply 5-partite; segments obovate, spathulate. Fruit depressed globose, ·7 in. across, seated on a somewhat enlarged caruncled calyx; cocci with a large ventral hollow.

LAKHIMPUR, SIBSAGAR, NOWGONG, DARRANG.

Flrs. 1. Fr. 4.

5. Sauropus trinervius Muell. Arg.

An undershrub, about 4-5 ft. high, very bitter, glabrous. Leaves 2-4 by ·8-1·5 in., narrow, ovate-lanceolate, acuminate, membranous, glabrous, 3-nerved at the base; base rounded, truncate or cuneate; petiole ·05-·1 in. long; stipules triangular, lanceolate, subulate. Male flowers—in axils of imbricating bracts; calyx narrow. Female flowers—sepals 3, broad; petals 3, alternating. Ovary superior. Fruit 1 in. across, globose; cocci ·5 in. long, with a large ventral hollow.

CACHAR. SYLHET, KHASI HILLS, (upto 4,200 ft.).

Flrs. 5-8. Fr. 10-12.
20. **BREYNIA** Forst.

Shrubs or small trees. *Leaves* alternate, quite entire. *Flowers* minute, monœcious; perianth simple, calycine. *Male flowers*: perianth turbinate or urceolate, 6-lobed or 6-cleft; rims of tube thickened; disc obsolete; stamens 3; filaments united in a short truncate trigonous column; anthers adnate to the column; dehiscence extrorse; pistillode 0. *Female flowers*: perianth 6-cleft, coriaceous, persistent, somewhat accrescent; disc obsolete; ovary trilocular; styles 3, short, sparsely bifid or 2-partite. *Fruit* succulent or coriaceous, globose or depressed, 6-valved or breaking up irregularly, containing 3-6 indehiscent trigonous crustaceous cocci; albumen fleshy; embryo straight or nearly so; cotyledons flat, broad; radicle long.

Fruit depressed-globose, orange, •5•75 in. across:—

Female perianth greatly enlarged in fruit... 1. *B. patens*.

Fruit globose, red, •25--5 in. across:—

Female perianth hardly enlarged in fruit... 2. *B. rhamnoides*.


A shrub or small tree; branches spreading; branchlets slender, angular. *Bark* smooth, grey. *Leaves* distichous, •4•1•3 by •2•6 in., broadly elliptic, obtuse, membranous, glabrous, glaucous beneath; lateral nerves 3-6 on either half; petiole •05•1 in. long; stipules •1 in. long, subulate, persistent. *Flowers* appearing with young leaves, axillary; pedicels filiform in upper axils, male in lower. *Male flowers* pale yellow, fascicled; perianth rather turbinate, truncate or obscurely crenate, persistent and greatly enlarged in fruit; anthers acute to the staminal-column, which is produced beyond them. *Female flowers* greenish; perianth deeply cleft; segments 6, apiculate; ovary truncate; style 3, stout, bifid. *Fruit* depressed globose, •5•75 in. across, orange, obscurely 3-lobed. *Seeds* 3-gonous; aril orange-yellow.

**SIBSAGAR, GOALPARA, CACHAR, LUSHAI HILLS, GARO HILLS, KHASI & JAJINTIA HILLS,** (up to 5,000 ft.).

Flrs. 3-5. Fr. 7.
2. **Breynia rhamnoides** *Muell.*

A shrub o.: small tree, glabrous; branches horizontal; branchlets angular. *Bark* yellowish. *Leaves* distichous, usually close-set, 1.5-2.5 by 3-9 in., elliptic, obtuse or sub-acute, membranous, pale beneath; lateral nerves 4-7 on either half; base rounded or sub-acute; petiole 1-1.2 in. long; stipules 1 in. long, persistent, subulate. *Flowers* very small, fascicled; female mostly solitary; pedicels filiform (male shorter than the female). *Male flowers:* perianth turbinate or sub-campanulate, obscurely lobed or subentire; staminal-column truncate at the apex, produced beyond the adnate anthers. *Female flowers:* perianth cup-shaped, 6-lobed; lobes ovate or triangular, acute, persistent, scarcely enlarged in fruit; ovary truncate, hollowed at the top with 3 (rarely more) minute styles in the cavity. *Fruit* globose, smooth, succulent, dull red, 0.25 in. across.

**SIBSAGAR, DARRANG, KAMRUP, NOWGONG.**

Flrs. 12-3. Fr. Rainy season.

21. **Dryptes** Vahl. (Cyclostemon).

Trees or shrubs. *Leaves* alternate, coriaceous. *Flowers* dioecious, fascicled. *Male flowers:* calyx-segments 4-5, rarely 6-7, imbricate, broad, conical, somewhat unequal, ciliate; stamens 3-12, often numerous; filaments free; anthers large, introrse, rarely extrorse; cells parallel; disc central, plane or with elevated margin. *Female flowers:* calyx-segments as in male; disc hypogynous, usually annular, 1-3, rarely 4-locular; style somewhat short, rarely elongate; stigma dilated, sometimes sub-peltate, reniformly discoid; ovule 2 in each cell. *Drupe* globose or ovoid, rarely angular; endocarp coriaceous or sub-chartaceous. *Seed* sometimes one by abortion ecalcarate; testa thick; albumen fleshy; cotyledons broad, plain.

Stem without prickles:—

Stamens 6-8:—

Ovary 2-celled:—

Stigma peltate:—

Lateral nerves 8-12 on either half:—
123. EUPHORBIACEÆ.

Dryptes.

Fruit orange coloured, \( \cdot 6 \cdot 7 \) in. long :
- Pedicel \( \cdot 1 \) in. long. .. 1. D. subsessilis.

Lateral nerves 6-7 on either half :
- Fruit yellowish, 1 in. long :
  - Pedicel upto \( \cdot 2 \) in. long. .. 2. D. Griffithii.

Lateral nerves 10-12 on either half :
- Sepals sub-orbicular :
  - Pedicel \( \cdot 25 \) in. long. .. 3. D. indicus.

Lateral nerves 6-10 on either half :
- Sepals oblong :
  - Pedicel \( \cdot 1 \) in. long. .. 4. D. lancifolius.

Stamens numerous :
- Stigma 2, large, sessile :
  - Male flowers glabrous :
    - Lateral nerves 5-6 on either half. .. 5. D. eglandulosus.
  - Male flowers pubescent :
    - Stamens 16-20 :
      - Lateral nerves 10-14 on either half. 6. D. ellipticus.
    - Stamens about 12 :
      - Lateral nerves 10-12 on either half. 7. D. assamicus.

Stem with strong prickles :
- Ovary 2-celled :


A large tree (\( 70'/72'' \)). Bark greyish, fairly smooth, covered with large blackish warts, \( \cdot 2 \) in. thick; inside light brown, fibrous, with veins of darker brown, turning dirty brown. Leaves 3-6 by 1-2.5 in., oblong-lanceolate or oblong-elliptic, acute or acuminate, undulate or serrulate, coriaceous, glabrous; lateral nerves 8-12 on either half; base acute; petiole \( \cdot 1 \cdot 25 \) in. long. Flowers greenish yellow, rather fragrant, nearly sessile, clusters axillary or above the scars of fallen leaves. Calyx-segments concave, orbicular, greyish, pubescent outside. Ovary pubescent, 2-celled; stigmas 2 or 3, triangular, minute. Fruit orange-coloured, ovoid-oblong, obscurely 4-lobed, puberulous, \( \cdot 6 \cdot 8 \) in. long; peduncle thickened.

NOWGONG, N. C. HILLS.
Used for posts. Fruits are eaten.

Ffrs. 5. Fr. 11.
2. **Dryptes Griffihii** (Hk. f.) Pax et Hoffm. (Syn. Cyclostemon Griffithii Hk. f.).

A large tree. *Branches* very slender; wood hard, light brown. *Leaves* 4-7 by 2 in., elliptic-lanceolate or lanceolate-acuminate, membranous or thinly coriaceous, glabrous; lateral nerves 6-7 on either half; base equilateral; petiole ·2-·3 in. long. *Styles* slender; stigma peltate. *Fruit* ellipsoid, clothed with deciduous valvet when young, yellow when ripe, about 1 in. long; glabrous, crowned with the remains of the style; pedicel 1·5-2 in.

**UPPER ASSAM, MISHMI HILLS,** (Kew No. 4738).

3. **Dryptes indicus** (Muell. Arg.) Pax et Hoffm (Syn. Cyclostemon indicus Muell Arg.).

A tree. *Leaves* 3-5 in., obliquely ovate-lanceolate or oblong-lanceolate, caudate-acuminate, rather membranous, glabrous, green; lateral nerves 10-12 on either half, very slender; base unequal; petiole ·1-·13 in long. *Male flowers*—yellowish, minute, glabrous, 1- or 2-3 together; pedicels very slender. *Sepal* 4, sub-orbicular, ciliate. *Stamens* 4-6, included round a flat 2-lobed disk, introrse. *Ovary* silky; styles slender, tips dilated.


4. **Dryptes lancifolia** (Hk. f.) Pax et Hoffm. (Syn. Cyclostemon lancifolius Hk. f.). Vern. **Dieng-kwai,** Kh.

A large or middle-sized tree (90′/80′′); branchlets lenticellate. *Bark* greyish, smooth, ·16 in. thick; inside pale white with very faint brownish streaks, finely fibrous. *Leaves* alternate, bifarious, 3·5-7 by ·8-·2 in., lanceolate, finely acuminate, entire, coriaceous, glabrous; lateral nerves 6-10 on either half, arcuate; base unequal with thickened margins; petiole ·2-·5 in. long. *Flowers* in axillary pubescent racemes. *Sepals* oblong, pubescent, ciliate. *Anthers* 7 or 8 round a fleshy-pubescent disk. *Ovary* 2-celled, very shortly canescent outside; ovules 2 in each cell, pendulous; styles 2. *Fruit* oblong, minutely canescent, 1 by ·5 in., crowned with the remains of the style; peduncles 1·1-2·5 in.; mesocarp
chartaceous; embryo erect; cotyledons greenish white, flat, ovate; albumen uniform, oily, completely enveloping the embryo.

GARO HILLS, KHASI & JAINTIA HILLS.

Flrs. Hot season. Fr. 11-12.


A middle-sized tree (55'/48'') glabrous. Bark fairly smooth, but with numerous white lenticels, ·12 in. thick; inside light greenish-brown, somewhat granular; wood white, hard. Leaves 2·5-4 by 1-2 in., broadly elliptic or ovate-oblong, abruptly and obtusely long-acuminate, entire, coriaceous, glabrous; lateral nerves 5-7 on either half; base unequal, rounded or obtuse; petiole ·2·3 in. long. Male flowers glabrous. Female flowers long pedicelled, solitary or in few axillary tomentose clusters; sepals 4, unequal, velvety tomentose. Ovary tomentose, 2-celled; style triangular, dilated.

CACHAR.

Flrs. 3.


A middle-sized tree (45'/36''). Bark greyish warty, but fairly plain, ·12 in. thick; inside white, mottled with brown; wood cream coloured. Leaves 4-7·5 by 1-2·5 in., lanceolate or narrow-elliptic, bluntly acuminate, serrate, coriaceous, glabrous; lateral nerves 10-14 on either half, very slender; base unequal, cuneate or rounded; petiole ·1·3 in. long. Male flowers greenish-yellow in axillary fascicles of 4-20, rather fragrant, ·2·3 in. across; pedicels ·5·7 in. long; sepals 4, concave, orbicular, rusty pubescent, reflexed in open flowers, ·1 by ·12 in.; disk flat, orbicular, with a crenate margin, ·1 in. across; stamens 16-20 inserted below the disk;
filaments glabrous or sparsely hairy. Female flowers and fruit not seen.

N. C. HILLS.

Frs. 5.


A small or middle-sized evergreen tree (45'/30''); branches slender, usually pendent. Bark ashy, .12 in. thick, fairly smooth; inside light brown; wood hard, brown. Leaves 2-7 by 1-3 in., elliptic-oblung or narrow oblong, acute or acuminate, serrulate, rarely entire, coriaceous, glossy green, glabrous; lateral nerves 8-12 on either half; base unequal, acute; petiole .2-.5 in. long, pubescent; stipules subulate, deciduous. Male flowers sepals usually 4, imbricate; stamens about 12; filament free. Female flowers short pedicelled in small axillary clusters. Ovary usually 2-celled, rusty-tomentose; stigma minute, sessile. Fruit globose, deep red when ripe, .5-.8 in. across, more distinctly 4-lobed towards the base, rusty, velvety tomentose.

Common throughout the province.
Fruits are edible.

Frs. 10-1. Fr. 3-4.


A tree; stem with long prickle; young shoot finely silky. Leaves membranous, denticulate. Fruit sessile, solitary, always axillary, ellipsoid, velvety, .75 in. long, 2-celled, but 1-seeded, supported by 3 round persistent sepals, crowned by the stigma consisting of 2 sessile circular plates.

(Flowers unknown hence the position in the Genus is unknown).
(Brandis-Inuian Trees, p. 565).

23. GLOCHIDION Forst.

Evergreen trees or shrubs. Leaves bifarious, alternate, entire, shortly petioled. Flowers small, monœcious or
dioecious in axillary cluster; perianth simple; disc 0. Male flowers: calyx-segments usually 6 in 2 series, imbricate, spreading; stamens 3-8, connate in an ellipsoid or oblong column; connectives usually produced in free tips or connate in a column; anthers extrorse. Female flowers: calyx with 6 short imbricate segments or shortly tubular and unequally toothed or cleft. Ovary 3-15-celled; ovules 2 in each cell; styles connate in a column, lobed or toothed at the apex. Fruit a capsule of 3 or more 2-valved cocci, often with twice as many lobes as cells, globose or orbicular or depressed or intruded at the base and apex, crowned by the often enlarged style; cocci crustaceous or coriaceous; epicarp separable or not. Seeds hemispheric or laterally compressed; testa crustaceous with often a succulent coat; albumen fleshy; cotyledons flat.

Styles connate into a column:—

Anthers 4 or more:—

Female sepal 5-6, distinct or connate at base:—

Ovary 8-15-celled:—

Style broad, convex, with a hollowed top:—

Capsule on short stout pedicels. .. 1. G. multiloculare.

Style conical, truncate:—

Capsule sessile. .. .. .. 2. G. coccineum.

Ovary 3-8-celled:—

Style exserted:—

Capsule almost glabrous, usually 12-lobed:—

Leaves glabrous; base acute. .. 3. G. lanceolarium.

Capsule sessile, 8-10-lobed:—

Leaves lanceolate:—

Ovary tomentose. .. .. 4. G. Gamblei.

Capsule stalked, obscurely lobed:—

Leaves oblong or ovate-oblong:—

Ovary glabrous. .. .. 5. G. zeylanicum.

Ovary 3-8 celled:—

Style not exserted:—

Leaves elliptic-oblong, 5-7 in. long, tomentose beneath. .. 6. G. hirsutum.

Leaves lanceolate, 2-4 in. long, glaucous or thinly pubescent beneath. .. 7. G. oblatum.
Anthers 3:—
  Sepals 5-6, distinct or connate at base only:—
  Style exserted in flowers:—
    Female pedicelled:—
      Capsule 4-7 lobed, almost sessile. .. 8. G. Thomsoni.
    Branchlets pubescent:—
      Leaves ovate or elliptic, softly tomentose:—
      Capsule 4-7 lobed, almost sessile. .. 9. G. velutinum.
      Capsule 8-10 lobed, distinctly grooved (4-5 celled). .. 10. G. Heyneanum.
    Leaves lanceolate, very glaucous beneath:—
      Capsule 4-6 lobed, long pedicelled. .. 11. G. acuminatum.
  Female sessile or almost so:—
    Branchlets glabrous:—
      Leaves shining, glabrous, lanceolate:—
      Capsule 8-10 lobed. .. 12. G. Daltoni.
      Leaves-elliptic, acuminate:—
      Capsule 3-6 lobed. .. 13. G. khasicum.
  Style not or slightly exserted in flowers:—
    Leaves elliptic or elliptic-oblong, purplish beneath:—
      Style usually columnar, conical:—
      Capsule 3 in. across, obscurely 4-lobed. .. 14. G. assamicum.
    Leaves lanceolate, shining:—
      Ovary sub-globose, glabrous, usually 5-celled... 15. G. sphærogy-num.
  Leaves ovate-oblong or elliptic-oblong:—
    Ovary globose, pubescent, usually 6-celled. .. 16. G. arbores-cens.


An ever gregarious bushy shrub or small tree; branchlets pubescent, sometimes glabrous; twigs angular. Bark greyish, splitting vertically, thin; blaze red; wood cream-coloured. Leaves 1.5-4.5 by 5.1.5 in., oblong or elliptic-oblong, acute or obtuse, shining, entire, coriaceous, sometimes minutely puberulous above, glaucous beneath; lateral nerves 5-8 on either half, oblique; base acute; petiole 0.05-0.1 in. long;

SIBSAGAR, NOWGONG, LUSHAI HILLS, CACHAR, GOAL- PARA.

Flrs. Hot season. Fr. 11-2.

2. Glochidion coccineum Muell. Arg.
A shrub or small tree; branchlets angular, pubescent. Bark greyish, vertically-narrowly fissured. Leaves 3-7 in. long, oblong, elliptic-oblong or lanceolate, shortly and bluntly acuminate, entire, coriaceous, glabrous (slightly pubescent when young); lateral nerves 6-8 on either half; base rounded or obtuse; petiole 1·1-1·6 in. long. Flowers clustered; pedicels slender, long in male flowers; sessile in female. Anthers 5 or more. Sepals ovate. Anthers 5 or more. Style conical with a crenulate hollowed tip. Ovary hairy. Capsule depressed, globose, 4·5 in. across, 16-20-lobed. Seeds scarlet.

SIBSAGAR.

Flrs. 2-4. Fr. 8 (remains long on the tree upto the next flowering season).

A shrub or a middle-sized tree (38'/25’”) with spreading crown. Bark greyish or greyish-brown, closely and reticulately fissured, often exfoliating in flakes, very light-red inside, 2 in. thick; blaze greenish-brown; wood brownish white. Leaves 3-8 by 1-3·5 in., elliptic, elliptic-oblong or elliptic-lanceolate, bluntly acuminate, coriaceous (leathery), entire, dark glossy green above, pale beneath; lateral nerves 7-10 on either half: base acute; petiole 2·5 in. long; stipules stiff, acuminate, almost thorn-like. Male flowers yellowish, numerous, on slender pedicels; sepals linear-oblong; connective long, acute; anthers 4-6. Female flowers greenish, sessile, 1-3 or more, fascicled; sepals glabrous, coriaceous, cuspidate. Ovary
villous, 6-8-celled; style conical from a thick base, as long as ovary. Capsule orbicular, depressed, 6-9 in. across (12 lobed-Brandis), largest in the genus.

SIBSAGAR, LAKHIMPUR, SYLHET, GOALPARA, KHASI & JAINTIA HILLS, (upto 6,000 ft.).
The seeds yield an oil for burning. The wood is believed to be hard and durable.

Frs. 9-11. Fr. 2-5.


A middle sized tree, sometimes quite large (60'/65''), glabrous. Bark dark cinnamon brown, exfoliating in thin oblong papery flakes (in large trees), otherwise with vertical parallel fissures, 2 in. thick; inside light red, fibrous. Leaves 2-5 by 8-1.3 in., lanceolate, acuminate, entire, coriaceous, deep glossy green above, paler beneath; lateral nerves 6-9 on either half; base unequilateral, oblique, acute; petiole 0.05-0.12 in. long. Male & Female flowers usually in separate clusters; sepals oblong, obtuse; connective acute; anthers 4-5; style twice the length of sepals, clavate, suddenly contracted, truncate, 4-5-lobed, glabrous. Ovary tomentose. Fruit 5-6 in. across, depressed, 8-10 lobed. Seeds obscurely trigonous.

GOALPARA, GARO HILLS.

Frs. 3-4. Ripe fruit persists on the tree upto the next flowering season.

5. Glochidion zeylanicum A. Juss.

A small or middle sized tree, almost glabrous. Bark grey, thin, corky. Leaves 3.5-6 by 1.5-3 in., oblong, elliptic-oblong; or ovate-oblong, obtuse or bluntly acuminate, entire, coriaceous, glabrous, green and shining above, paler beneath; lateral nerves 8-10 on either half; base inequilateral, rounded or cordate; petiole 1-2 in. long; stipules 12 in. long, acute. Male & Female flowers usually shortly pedicelled, together in umbellate clusters, shortly pedunculate, axillary or supra-axillary; female flowers more numerous. Sepals 5-6 and similar in male and female, ovate-oblong, fleshy, rounded at the apex, glabrous; anthers 5-7. Ovary glabrous,
4-7-celled; style united into a short cone, 5-8 dentate at the apex. *Capsule* sub-globose, obscurely lobed, \(\cdot4\cdot6\) in. across.

SIBSAGAR (Deroi Reserve, Kanjilal's No. 1871).

Flrs. Rainy season. Fr. 10-12.


A shrub or small tree; young parts softly tomentose. *Leaves* 5-7 in. long, elliptic-oblong or oblong-lanceolate, coriaceous, densely and softly white or rusty-tomentose beneath; lateral nerves 10-13 on either half; base rounded or cordate; petiole \(\cdot16\) in. long. *Male & Female flowers* usually in the same cluster, usually supra axillary; peduncles usually short and stout. *Male flowers* pedicels slender, \(\cdot2\cdot5\) in. long; sepals 6, hirsute externally, glabrous within; anthers 6; connective short. *Female flowers* hirsute; pedicels short; sepals 6. *Ovary* globose, glabrous or hairy; style conical, shorter than the sepals and often entire. *Capsule* 4-6-celled, globose, obscurely lobed, not deeply intruded at base and apex.

LAKHIMPUR, SIBSAGAR, CACHAR, KHASI HILLS.

Flrs. 11-12. Fr. 2.


A small tree; branchlets tomentose. *Bark* reddish-brown, finely fibrous, \(\cdot12\) in. thick. *Leaves* \(\cdot8\cdot4\) by \(\cdot5\cdot1\) in., lanceolate, oblong-lanceolate, acute, entire, coriaceous, glabrous above except the midrib, glaucous and sparsely pubescent beneath; lateral nerves 4-8 on either half; base oblique, acute; petiole \(\cdot05\cdot1\) in. long; stipules filiform. *Male flowers* \(\cdot2\) in. across, yellowish, pubescent; pedicels filiform, \(\cdot5\cdot7\) in. long; sepals sub-spathulate or obovate; anthers 4-6. *Female flowers* minute, very shortly pedicelled, tomentose. *Ovary* 4-5-celled, densely tomentose; style short, stout,
conic, not exserted. *Capsule* depressed, orbicular, obscurely lobed, pubescent, crown not intruded.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, LUSHAI HILLS, N. C. HILLS.

Flrs. 5. Fr. 11-12.

8. **Glochidion Thomsoni** Hk. f.

A tree (35'/25'') with spreading crown, glabrous. *Bark* greyish, •3 in. thick; inside reddish, fibrous; wood cream-coloured. *Leaves* 2-5-5 by •8-1-5 in., elliptic or oblong-elliptic, shortly and bluntly acuminate, thinly coriaceous, green and glabrous above, glaucous beneath; lateral nerves 6-9 on either half, very slender; base oblique, acute or obtuse; petiole •1-•3 in. long. *Male flowers* few, minute; sepals elliptic; anthers 3; connective short. *Female flowers* numerous; pedicels about •9 in. long; sepals minute. Ovary 3-lobed; style a fleshy depressed 3-grooved cone. *Capsule* 3 in. across, usually 6-lobed (more or less).

CACHAR, SYLHET, GARO HILLS, KHASI & JAINTIA HILLS, (4-5,000 ft.).

Flrs. 7-8. Fr. 9-10.


A shrub or a small tree, softly tomentose or pubescent. *Bark*, brownish, rough, 3-4-5 in thick; inside reddish, fibrous; wood cream-coloured. *Leaves* 1-5-5 by 1-2-25 in., ovate, elliptic, oblong or lanceolate, acute, obtuse or abruptly and shortly acuminate, coriaceous, glabrescent above, tomentose beneath; lateral nerves 5-10 on either half; base rounded or narrowed to the petiole (•05-•15 in. long). *Flowers* in axillary clusters; males and females usually together. *Male flowers* •15 in. long; pedicels filiform, pubescent; sepals 6, unequal, pubescent outside, glabrescent within; stamens 3; anthers connate in the lower half; connective acute. *Female flowers* pedicels short, stout, pubescent; calyx pubescent; segments free nearly to the base, unequal. *Ovary*
pubescent, 4-7-celled; style thickened at the tip, truncate, 4-7 toothed. *Capsule* ·3·5 in. across, depressed, usually 4-7 lobed (I have found up to 10 lobes). *Seeds* red.

DARRANG, SIBSAGAR, KAMRUP, N. C. HILLS, KHASI & JAIN'TIA HILLS.

Frs. 10. Fr. 1.

10. **Glochidion Heyneanum** *Wight.*

A large tree; branchlets tomentose. *Leaves* 2-5 in., elliptic or oblong, obtuse, acute or cuspidate, coriaceous, glabrous above, sparsely pubescent beneath; lateral nerves slender; base acute; petiole ·1 in. long; stipules triangular. *Male flowers* small, short-pedicelled; sepals hoary-pubescent; anthers 3. *Female flowers* pedicels longer; sepals narrow. *Ovary* 4-5-celled; style slender, clavate, truncate, pubescent, exserted, twice the length of perianth. *Capsule* depressed, ·3 in. across, 8-10-lobed, at length glabrous.

Makum Forests, Lakhimpur, KHASI HILLS, (G. Mann).

Frs. 3. Fr. 9-10.


A middle sized tree (35'/30''); branchlets pendent; young parts pubescent. *Bark* greyish-brown, exfoliating in irregular-shaped scales, ·12 in. thick; inside reddish-brown, fibrous. *Leaves* 2-5 by ·5·1·5 in., oblong, acuminate or lanceolate, sub-coriaceous, puberulous, glaucous beneath; lateral nerves 7-12 on either half; base oblique, cuneate or rounded; petiole ·05·12 in. long; stipule acuminate. *Flowers* all pedicelled, fascicled. *Male flowers* small; sepals obovate; anthers 3; connective imbricate. *Female flowers* style clavate, twice the length of the sepals. *Capsule* 4-6 lobed, ·2·3 in. across; stalk ·25·3 in. long. *Seeds* reddish, shining.

N. C. HILLS, KHASI & JAIN'TIA HILLS, (4-5,500 ft.).

Frs. 4. Fr. 9.

A deciduous shrub or small tree; branchlets glabrous. Leaves 2-5 by 1.5-2 in., lanceolate or oblong-lanceolate, acuminate, glabrous, shining; lateral nerves slender; base acute; petiole 0.1 in. long; stipules ovate, acute. Flowers both sexes in the same fascicles. Male flowers glabrous; sepals oblanceolate; pedicels 0.2-0.5 in. long; anthers 3. Female flowers almost sessile; sepals glabrous without, sparsely pubescent within. Ovary tomentose, 4-6 celled; style clavate, 4-6-toothed. Capsule 0.5-0.8 in. across, nearly sessile, 8-10-lobed, crowned by the deciduous style when young.

N. E. F. TRACT. (No specimen in Forest Herbarium, Shillong).

Flrs. 3.


A middle sized tree (35'/40''), glabrous; branchlets angular. Bark fairly smooth, brownish; inside reddish brown with fine white streaks. Leaves 2-6 by 0.8-2.5 in., elliptic, ovate-elliptic, entire, acuminate, coriaceous, glabrous (brownish beneath when dry); lateral nerves 5-7 on either half. arcuate; base oblique, inequilateral, rounded, obtuse or truncate; petiole 0.1-0.3 in. long. Male flowers shortly pedicelled; sepals lanceolate, obtuse; anthers 3; connective imbricate. Female flowers sub-sessile; sepals ovate-oblong, unequal; style 2-3 times the length of the sepal, sub-cylindric, unequally 2-3-toothed. Ovary glabrous. Capsule 0.3 in. across, depressed, globose, 6-12-lobed, glabrous, reddish when ripe.

KHASI & JAIN'TIA HILLS, (upto 5,500 ft.).

Flrs. Hot season. Fr. 9-11.


A shrub or middle sized tree (45'/36''); branchlets glabrous, angled. Bark greyish, thin; blaze reddish, fibrous; wood
cream-coloured. *Leaves* 2-7 by 1-3 in., elliptic or elliptic-oblong or lanceolate, acuminate, entire, coriaceous, glabrous, pale purplish beneath; lateral nerves 6-9 on either half; base acute; petiole 1-5 in. long. *Male flowers* clustered; pedicels slender, long; sepals narrow, somewhat dilated towards the apex; anthers 3 (sometimes 4-5). *Female flowers* densely clustered, subsessile; sepal linear-oblong; style columnar. *Ovary* globose, glabrous or pubescent. *Capsule* 3 in. across, obscurely 4-lobed.

**LAKHIMPUR, SIBSAGAR, DARRANG, KHASI & JAINTIA HILLS,** (upto 4,500 ft.).

Flrs. 3-6. Fr. Cold season.


A middle sized or small tree, glabrous; branchlets pendulous. *Bark* dark grey or greyish brown, softly corky, fibrous, 6 in. thick; inside pink to brick red; wood cream-coloured. *Leaves* 2-6.5 by 6-1.5 in., lanceolate or narrow lanceolate (falcate), acuminate, coriaceous, shining, glabrous; lateral nerves 7-10 on either half; base oblique, inequilateral, acute or rounded; petiole 1-3 in. long; stipule triangular. *Male flowers* small, pedicelled; sepals elliptic; anthers 3. *Female flowers* densely fascicled, sub-sessile; sepals orbicular. *Ovary* glabrous, usually 5-celled; style entire, very large, sub-globose. *Capsule* deeply 8-12-lobed, 25-5 in. across, depressed in congested fascicles of 6-10 on tubercles.

**SIBSAGAR, MANIPUR, CACHAR, SYLHET, GOALPARA, GARO HILLS, KHASI.**

Flrs. Hot season. Fr. 11-1.


A small or middle sized tree (40′/30′′); branches spreading. *Bark* greyish-brown, fissured, 5 in. thick; inside red with white streaks. *Leaves* 3-9 by 1-3-4 in., ovate or
ovate-oblong, elliptic or elliptic-oblong, acute or shortly acuminate, coriaceous, glabrous above, pubescent beneath densely along the nerves; lateral nerves 6-9 on either half; base oblique, rounded or shallow cordate; petiole •2•5 in. long. Male flowers calyx-segments 3, pubescent. ovate-oblong. Female flowers fascicled, subsessile or shortly pedicelled, pedicels pubescent; calyx segments 6, rusty-pubescent, purplish inside. Ovary globose, pubescent, 6-celled; style connate. Fruit sub-globose, •25 in. across.

LAKHIMPUR, N. C. HILLS, CACHAR, SYLHET.

Flrs. 4. Fr. 1-2.

G. mishmiense Hk. f.

A small tree; branches stout, brittle, ribbed, tomentose. Leaves 4-8 by 2-2•5 in., oblong, obtuse or bluntly acute, coriaceous, glabrous except the nerves; lateral nerves 8-10 on either half, prominent beneath; base acute or rounded. Stigma sub-globose or very shortly conic, sunk in the apical depression. Capsules depressed, 5 in. across. 8-10-lobed, hoary-tomentose. Seeds •12 in. across, mermispheric, red.

N. E. F. TRACT (Burkill 37789) 2,500 ft., MISHMI HILLS, AKA HILLS, (Forest Herbarium, Shillong, 16620).

Flrs. 8. Fr. 1.

24. JATROPHA Linn.

Herbs, shrubs or trees often prickly or glandular. Leaves alternate, entire or digitately lobed or partite; stipules often ciliate. Flowers monœcious in terminal cymes; the central flowers of the cyme or its fork usually female; perianth usually double. Male flowers calyx-segments 5, often coloured, imbricate; petals 5, free or connate, disk entire or of 5 glands; stamens numerous; filaments all or the inner connate below; anthers erect, ovate or oblong; the cells parallel, contiguous. Female flowers calyx as in male; petals sometimes absent. Ovary 2-4 celled; ovules solitary in each cell; styles connate below, 2-fid above; the lobes entire or again 2-fid. Fruit a capsule 2-4 two-valved cocci; endocarp crustaceous or bony. Seeds ovoid or oblong; testa crustaceous; albumen fleshy; cotyledons broad, flat.
Petals free or nearly so:—

Petioles clothed with numerous fascicled and branched gland-tipped bristles. .. 1. J. gossypifolia.

Petals united to the middle:—

Petiole glabrous. .. 2. J. Curcas.


A shrub. Leaves palmately 3-5-lobed; petioles clothed Lal-Bherenda, Beng.


A native of Brazil, cultivated in gardens and found as an escape.

Flrs. & Fr. Usually rainy season.


A soft-wooded deciduous shrub or small tree; young parts tomentose; trunk irregular. Bark yellowish-brown, thin and papery on stem; leaf scars prominent. Leaves 3-6 by 3-5 in., sub-orbicular, ovate, broadly cordate, usually 3-5 lobed, shortly acuminate or acute, glabrous or sparsely pubescent on the nerves beneath; petiole 3-9 in. long. Flowers greenish yellow, in long-peduncled often panicled pubescent cymes. Male flowers calyx-segments 5, somewhat unequal, elliptic or obovate; corolla campanulate, exceeding the calyx; lobes 5; stamens 10, in 2 series. Female flowers calyx-segments ovate, acute; corolla scarcely exceeding the calyx; styles 3, connate at base; stigma 2-fid. Fruit ~7-1 in. long, ovoid-oblong. Seeds oblong, dark-brown.

Native of TROPICAL AMERICA, cultivated and naturalised. Makes good hedges. The juice is believed to be good for sores. The seed oil is medicinal as a purgative and poisonous in large doses.

Flrs. & Fr. Almost throughout the year.
25. ALEURITES Forst.


A large handsome evergreen tree; young parts stellately tomentose. *Leaves* 4-12 by 2-5 in., variable, ovate or ovate-elliptic, deltoid or rhomboid, often lobed, acute or acuminate, undulate, obscurely crenate or entire, coriaceous, pustular beneath; petiole 2-5 in. long, biglandular. *Flowers* monoecious, in large terminal tomentose panicked cymes. *Calyx* velvety, bursting into 2 valvate lobes; petals 5, 2-25 in. long. * Stamens* 15-20, on a hairy receptacle. Ovary 2-celled, hairy; style with 2 long arms. *Drupe* 2-2.5 in. across. *Seeds* oily, edible.

KAMRUP, GOALPARA. Cultivated. Introduced from Malaya.

A. cordata Steudel.


SIBSAGAR, LAKHIMPUR.

A. Fordii Hems. and A. montana Wilson have been successfully grown in plantations in Sibsagar (Noajan) and other localities in Assam.

The possibilities of *Tung oil* which the above species yield are by no means inconsiderable, as it is used in India in large quantities, much of which is imported.

It is used in laquering, varnishing, water proofing, oil cloth manufacture, etc.

Frs. Rainy season. Fr. 9-10.

26. CROTON Linn.

Trees or shrub, rarely herbs. *Leaves* alternate, rarely opposite or whorled, 2-glandular at the base. *Flowers* usually monoecious, solitary or clustered, on the rachis of a terminal spiciform raceme; female flowers at the base; bracts small. *Male flowers*, calyx 5-(rarely 4 or 6) partite; segments imbricate or sub-valvate; petals 5 (rarely 4-6), never exceeding but sometimes smaller than the calyx; disc of 4-6 glands opposite the calyx segments; stamens many, inserted
on a hairy receptacle; filaments free, reflexed in bud; anthers adnate; cells parallel; pistillode 0. Female flowers calyx segments usually more ovate than in male, rarely accrescent; petals smaller than the calyx segments or obsolete; disk annular or of 4-6 glands. Ovary 3 (rarely 2-4) celled; ovules solitary in each cell; style slender, 2-4-cleft. Fruit a capsule, sub-equally 6-valved or of 3 separating 2-valved cocci. Seeds smooth; caruncle small; testa crustaceous; albumen copious; cotyledons flat.

Ovary lepidote or tomentose:—
Inflorescence lepidote:—
Leaves repand-toothed or serrate-crenate:—
   Petiole 1-2 in long:—
      Capsule sub-globose, 3-7 in. across.
Leaves quite entire or remotely serrate acuminate:—
   Petiole 3-2 in. long:—
      Capsule ovoid, 1-1·5 in. long. 1. C. oblongifolius.

Inflorescence stellately pubescent:—
   Basal nerves 3-5:—
      Leaves scaberulous or pubescent with stellate hairs:—
         Racemes 4-10 in. long:—
            Stamens silky below. 2. C. Joufra.
   Leaves glabrous:—
      Racemes 2-3 in. long:—
Inflorescence glabrous:—
   Leaves membranous, glabrous:—
      Racemes 2-4 in. long:—
         Stamens about 10. 4. C. Tiglium.
Ovary glabrous:—
   Calyx segments much enlarged in fruit:—
      Leaves lanceolate, caudate-acuminate, serrulate. 5. C. lævifolius.


A middle-sized tree (40°/30”), often gregarious; young parts clothed with peltate orbicular scales. Bark greyish,
with fine reticulating vertical fissures; inside light pinkish to cream, mottled with white streaks, aromatic. *Leaves* 3-9 by 1·2-4 in., crowded at the ends of branchlets, elliptic-ovate or oblong-lanceolate, obtuse, sub-acute or bluntly acuminate, serrate or crenate, rather coriaceous, glabrous, dark green, covered with minute raised dots, paler beneath; lateral nerves 10-16 on either half, faint; base narrowed into the petiole (·5·2-5 in. long); stipules caducous, ·3 in. long. *Flowers* pale yellowish green, solitary or fascicled, in the axils of minute bracts, arranged in terminal or axillary racemes; upper males and lower females. *Male flowers* ·25 in. across; pedicels filiform; calyx segments 5, slightly connate, ovate, obtuse; petals 5, concave, oblong, woolly; stamens 12, inflexed in bud; filaments hairy at the base; disk of 5 glands. *Female flowers* calyx segments 5, acute, ciliate; petals obovate, woolly; disk annular. *Ovary* densely clothed with stellate scales, trigonous, 3-celled; ovule solitary in each cell. *Fruit* sub-globose, 3-lobed, over an inch long, ·3·7 in. across. *Seeds* ellipsoid, smooth.

CACHAR, SYLHET, GOALPARA, CARO HILLS, NOWGONG, KHASI & JAINTIA HILLS.

Flrs. 12-2. Fr. 3-4.


A shrub or a middle-sized tree (40'/30''). *Bark* greyish, exfoliating in vertical pieces, exposing a yellow surface, with vertical lenticels, about ·4 in. thick; blaze reddish white; wood whitish, hard. *Leaves* faintly aromatic 2-12 by 1·3·5 in., elliptic, linear or obovate-lanceolate, acuminate, quite entire or remotely repand, serrulate, coriaceous, glabrous, green above, paler beneath; midrib lepidote beneath; lateral nerves 10-16 on either half; base acute; petiole ·3·2 in. long. *Racemes* lepidote. *Calyx* segments stellately lepidote, ovate. *Petal* villous. *Stamens* 12; filaments villous. *Ovary* stellately tomentose; styles slender, 2-cleft. *Capsule* ovoid, 1-1·5 in. long, lepidote, faintly 3-lobed.
Common throughout the province, (upto 3,000 ft.). Bark and leaves are used for fermenting liquor. Bark is used as a veterinary medicine.

Flrs. 12-3. Fr. 5.


A large scandent shrub; young parts stellately bristly, hairy. *Bark* brownish black, old bark exfoliating in pieces exposing a whitish surface; blaze greenish white; wood whitish. *Leaves* 1.5-6 by 8-3.5 in., ovate, sub-orbicular or ovate-acuminate, coarsely toothed or crenate-serrate, subcoriaceous, scaberulous above, stellately pubescent beneath, hairy on both surfaces; basal nerves 3-5; base rounded, cordate or almost truncate; basal glands stalked; petiole 3-2 in. long, scaberulous; stipules glandulose. *Racemes* slender, 4-10 in. long, stellately pubescent. *Flowers* in fascicles. *Male flowers* tomentose; petals as long as sepals. woolly; stamens 18-30. *Female flowers* sepals ovate, oblong; petals very small. *Ovary* stellately woolly; style 2-partite. *Capsule* obscurely 3-gonous, scabridly rusty-pubescent, globose or oblong, 7-1 in. long.

Fairly common throughout the Province. Tender shoots are used as a medicine for cholera. Used by Mikirs to blacken their teeth. A sort of gum exuded early in the morning is said to cure Cataract.

Flrs. 3-5. Fr. Cold season.


A small evergreen tree; young leaves brown; young parts sparsely stellate-hairy. *Bark* grey, corky and lenticelled, about 12 in. thick, pale green within, variegated from outside with tooth-like intrusions of paler tissue; wood white; pores somewhat large, in distant radial groups of 2-3. *Leaves* 2.5-5 by 1-3 in., ovate or elliptic-oblong, acute or acuminate, more or less serrate, membranous, glabrous; basal nerves
3-5; base somewhat unequal, usually rounded; basal glands 2, almost sessile; petiole 5-2 in. long. Racemes 2-3 in. long, glabrous. Male flowers sepals bearded at the apex; petals woolly; stamens 15-25, glabrous. Female flowers sepals sparsely hairy at base within; petals 0. Ovary stellately hispid. Capsule 75-1 in. long, obovoid, whitish, obtusely trigonous (rarely 4-gonas). Seeds 5-6 in. long, obliquely oblong, somewhat glabrous, pale brownish.

A native of MALAY ARCHIPELAGO, now naturalized. SIBSAGAR, DARRANG, KHASI and JAIN'TIA HILLS, (3,000 ft.).

The seed oil is a drastic purgative. The wood is used for cleansing the teeth and for curing and relieving tooth ache.

Fhrs. Hot season. Fr. Cold season.


A middle-sized tree (55'/66°). Bark greyish or greyish green, about 3 in. thick; inside pinkish brown with lighter streaks, finely fibrous; wood tough; medullary rays very fine and close. Leaves 1-4 by 5-1.5 in., elliptic, elliptic-oblong or elliptic-lanceolate, acute or shortly acuminate, remotely and obscurely serrate, sub-coriaceous, glabrous; lateral nerves 6-12 on either half, slender; base acute; basal glands stalked; petiole 2-8 in. long, fugaciously stellate-pubescent; stipule filiform, caducous. Racemes glabrous, 2-4 in. long. Male flowers sepals bearded at the apex; stamens about 10; filaments glabrous. Female flowers sepal ovate-acute, glabrous. Ovary globose, sparsely hispid; styles 2-partite. Capsule 25 in. across, sub-globose, somewhat depressed, glabrous. Seeds usually 2, rarely 3, brownish black; cotyledons flat.

KHASI & JAIN'TIA HILLS, (4,500-5,500 ft.).

Fhrs. Hot season. Fr. Cold season.

6. Croton chlorocalyx Wall.

A small deciduous tree, quite glabrous. Leaves 4-8 by 8-1.2 in. lanceolate or narrow lanceolate, long-acuminate, obscurely serrulate, membranous, glabrous, paler beneath; lateral nerves 10-15 on either half; base narrowed into the
petiole which is \( \cdot 4-\cdot 6 \) in. long. Racemes cymose, shorter than the leaves, slender. Male flowers \( \cdot 16 \) in. across; sepals and petals obtuse; apex bearded; disk eglandular; stamens 12-15. Female flowers sepals oblong, foliaceous; petals subulate; disk 0. Ovary 3-lobed, oblong, glabrous, shortly stipitate; style 3, connate below, stout, recurved, 2-fid.


\( \text{C. sparsiflorus Morung} \).

An undershrub, forming bushes, often straggling, faintly fragrant; twigs green, with elongated lenticels, tubercled or striated, densely covered with stellate hairs. Leaves scattered, crowded near the ends of branches, 1-2-5 by \( \cdot 4-\cdot 9 \) in., lanceolate, elliptic-lanceolate, undulate, rather obscurely serrate, acute or sub-acute, membranous, dark-green and glabrous above, paler and sparsely hairy beneath; base rounded or obscurely cordate; petiole \( \cdot 2-\cdot 3 \) in. long, grooved above, stellately hairy. Flowers monœcious, male upwards, female below, in terminal inflorescence. Disc of 5 small orange-red glands. Male-flowers pedicelled, in clusters of 3-4; sepals 5, valvate, ovate, acute; petals 5, alternate with the sepals, attenuated at base; stamens 15-20; filaments inflexed in bud. Female-flowers sepals 5, lanceolate, green, persistent. Ovary 3-locular, ellipsoid, densely stellate-hairy; style, spreading; ovules solitary in each cell, pendulous. Fruit triquetrous, shallowly 3-grooved, ellipsoid, stellately hairy; pericarp dehiscing into 3 cocci. Seeds pendulous; caruncle forming an oblique thin white somewhat dentate cup.

ASSAM. (Native of South America, introduced).

Flrs. 5-7. Fr. 7-9.

27. TRIGONOSTEMON Blume.

\( \text{Trigonostemon semperflorens} \) Muell Vern. Dieng-soh-pyda, Dieng-soh-kot, Kh.

A shrub 6-8 ft. high; branchlets tubercled, stout, hispid. Bark greyish brown, splitting vertically, thin; blaze brown. Leaves variable 5-12 by 1-5-3 in. (crowded together at intervals) panduriform or oblanceolate, obscurely serrulate, sparsely ciliate, acuminate, membranous, glabrous above, sparsely pubescent on the nerves beneath; lateral nerves 12-16 on either half; base rounded or cordate; petiole \( \cdot 1-\cdot 5 \) in. long. Flowers monœcious. Male flowers many, purplish; sepal 5, imbricate; petals 5; disc glandular, stamens
3; anthers at the end of cylindric columns. Female flowers in axillary few flowered cymes or solitary; sepal 5, green, hairy; petals 5, dark purple, with white veins, glabrous. Ovary hispid; style with 2-fid arms. Capsule 3-5 in. across, 3-lobed, sub-sessile, hispid. Seeds 3, mottled (light and dark brown); albumen copious; cotyledons flat, thin (not folded).

ASSAM, N. C. HILLS, SYLHET, KHASI & JAINTIA HILLS, (5,000 ft.).

Flrs. & Fr. 5-11.

28. OSTODES Blume.

Trees or shrubs. Leaves alternate, penninerved. Flowers dioecious or monoeious, fascicled in lax terminal or axillary panicked racemes; female in separate racemes or solitary in the male inflorescence. Male flowers sepals usually 5, unequal, imbricate; petals usually 5 (or 6); stamens numerous (8-35) inserted on a convex or columnar receptacle; anthers dorsifixed; cells parallel; connective, broad; pistillode 0. Female flowers ovary 3-celled; 1 ovule in each cell; style 2-cleft. Capsule sub-globose, 6-ribbed, imbricately breaking up into 2-3-valved cocci; albumen fleshy; cotyledons broad, flat.

Leaves large (5-12 in. long), serrate, acuminate 1. O. paniculata.
Leaves smaller (2-2-5 in. long), crenate, shortly acute. 2. O. Prainii.


A tree (40'/35'') with spreading crown (exuding reddish gum like Bischofia javanica); branches often with false whorls. Bark greyish, 3 in. thick; inside brown mottled white; wood whitish; leaf scars very prominent, tubercled. Leaves often crowded at the ends of branchlets, 5-12 by 3-6 in., ovate or cordate, acuminate, distantly serrate, chartaceous, dark green above, paler beneath; base truncate or rounded, 3-nerved, glandular; lateral nerves 5-7 (above basal nerves) on either half, very prominent; petiole upto 10 in. long. Inflorescence a panicle, hairy; flowers rosy-white, 3 in
across. Male flowers sepals 3; petals 4-5, unequal, shortly clawed; stamens numerous (20-35); filaments free, minutely hairy at base; anthers introrse. Capsule sub-globose, 3-lobed 1·25 in. long. Seeds globose, 1 in. across.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, SYLHET, GARO HILLS, DARRANG, NAGA HILLS, MANIPUR, KHASI & JAINTIA HILLS, (upto 4,000 ft.).

Flrs. 3-4. Fr. Rainy season.

2. Ostodes prainii Gandoger.

Trees, glabrous; branches divaricate. Leaves 2·2-4 in., broadly ovate, sub-oblong, shortly acute, shortly crenate, glaucous beneath; base truncate or attenuate. Flowers in narrow lax panicled racemes; rachis erect, 2-4-flowered. Calyx and corolla short. Fruit large, sub-globose or turbinate at base, ±8 in. across, broadened.


29. BLACHIA Baill.

Blachia umbellata Baill.

A shrub or a small tree, exuding mliky juice, somewhat rambling, triquetrous. Bark light grey. Leaves 3-6·5 by 1·5 in., elliptic-obovate, elliptic-lanceolate or elliptic-oblong, cuspidately acuminate, entire or undulate towards the apex, recurved, sub-coriaceous, glabrous, dark green above, paler beneath; lateral nerves slender, 7-13 on either half; base rounded or narrowed into the petiole (±2·4 in. long). Male flowers umbellate; peduncle filiform, 1·3 in. long; perianth ±25 in. across. Female flowers rather racemose; peduncle slender, 1·5 in. long; pedicels dilated towards the top; perianth ±25 in. across, enlarged in fruit. Capsule ±5 in. across, sub-globose, deeply lobed. Seeds oblong, mottled, ±3 in. long.

NOWGONG.

Flrs. 8. Fr. 11.
30. SUMBAVIA Baill.

Sumbavia macrophylla Muell. Vern. Laimokhau, Kach.; Le-lang, Kuki,

A shrub or a small evergreen tree; stem pale brown, fairly smooth. Bark about \( \cdot05 \) in. thick, leathery. Leaves 5-12 by 1-5 in., elliptic-lanceolate or ovate, somewhat peltate acuminate, obscurely dentate, undulate or entire coriaceous, glabrous, green above, white felted beneath; lateral nerves 7-13 on either half, prominent beneath; base rounded or cordate; petiole \( \cdot6-3\cdot5 \) in. long, swollen and somewhat geniculate at the top. Flowers in terminal androgynous rusty tomentose bracteate racemes (sparingly branched or unbranched). Male flowers in fascicles of 4-6, nearly sessile, supported by a triangular bract; pedicel \( \cdot1-\cdot25 \) in. long; sepals 5, valvate, covered with stellately hairy scales; petals 5, imbricate, ovate, \( \cdot1 \) in. long, membranous, green; stamens many; filaments glabrous, \( \cdot1-\cdot16 \) in. long; anthers versatile. Female flowers pedicelled, in same cluster with male, solitary in each cluster; pedicels \( \cdot1 \) in. long. Ovary stellately tomentose, 3-celled; styles recurved; ovules 1 in each cell. Fruit 2-3 lobed, \( \cdot25-\cdot4 \) in. across.

DARRANG, NOWGONG, N. C. HILLS, NAGA HILLS, MANIPUR. Brandis (Indian trees) says stamens 8, but in F.B.I. it is given as about 70. U. Kanjilal in his field note says upto 60. I have examined some flowers. I notice that the stamens are numerous.

Frs. Cold season. Fr. 4-5.

31. MANIHOT Tourn ex Adans.


A shrub. Leaves palmately 5-6 lobed, membranous, finely pubescent beneath; lobes oblanceolate, 3-7 by \( \cdot75-\cdot1\cdot5 \) in., petiole 6-12 in. long, usually reddish.

CACHAR, KHASI HILLS, GARO HILLS. Cultivated. Run wild.

The roots yield Cassava starch and Tapioca meal and form a valuable food stuff, specially in Garo Hills.

A middle sized tree. *Leaves* almost peltate, 6-10 in. in diameter, orbicular, glabrous, palmately deeply cleft; lobes elliptic-oblong or ovate-oblong, acute; petiole 2-6 in. long. *Flowers* large in terminal panicles; calyx campanulate; stamens 10, 5 short, 5 long. *Capsule* about 1 in. across, obscurely 6 grooved, pendulous.

A native of Ceara (Brazil). Cultivated. DARRANG, N. C. HILLS.

Yields the Ceara rubber.

32. **HEVEA** Aubl.

*Hevea brasiliensis* *Muell. Arg. Para rubber*.


Cultivated in N. C. Hills, (Lallacherra).

Yields the best caoutchouc of Brazil (Para rubber).

33. **GELONIUM** Roxb.


A middle-sized tree (45'/51''). *Bark* greyish, tubercled, closely vertically fissured, horizontally wrinkled, thick; inside uniformly light-brown, granular. *Leaves* 3-9 by 1·5-3·5 in., oblong, elliptic-oblong or oblong-lanceolate, blunt, usually entire, coriaceous, glabrous, pellucid dotted; lateral nerves 7-10 on either half; base cuneate or narrowed into the petiole which is 1-3 in. long. *Flowers* yellowish, fragrant, in pedunculate contracted cymes or clusters. *Perianth* simple, 5-6, imbricate. *Male flowers* 3-5 in. across; stamens numerous (40-60); disk 0. *Female* disk cupular; ovary 2-4-celled. *Fruit* globose, about 7·5 in. across, obscurely 3-lobed, blackish when ripe, tardily dehiscent, the valves spreading from a persistent axis. *Seeds* arillate. (Brandis).

NOWGONG, N. C. HILLS.

Fruits are eaten.

Flrs. 3-4. Fr. 4-5.
34. **CHAETOCARPUS** Thwaites.

**Chaetocarpus castanocarpus** (Roxb) Thwaites. Vern. Chambusi-buphang, Kach.; Bulkokra, Beng.

A middle-sized evergreen tree. *Bark* greyish, warty, 1/16 in. thick; inside dark brown, fibrous. *Leaves* 2.5-6 by 1-2 in., alternate, ovate-elliptic or ovate-oblong, acute or acuminate, quite entire, coriaceous, glabrous, glossy; lateral nerves 7-12 on either half; base usually rounded; petiole 0.02-0.3 in. long, *Flowers* dioecious, small, in axillary clusters; perianth simple. *Male flowers* sepals 4-6, imbricate; disk lobed; stamens 8; filaments connate into a column near the base. *Female flowers* sepals 4. *Ovary* 3-celled; ovules 1 in each cell; styles 2-fid. *Capsule* sub-globose, 0.75-1 in. long, echinate (spines twany, brittle) of 2 3-valved cocci; albumen fleshy; cotyledons broad, flat.

N. C. HILLS, CACHAR, SYLHET, KHASI & JAINTIA HILLS, (1,000 ft.).

Frs. 11-12. Fr. 2-3.

35. **BALIOSPERMUM** Blume.

Shrubs or undershrubs. *Leaves* alternate, toothed or lobed, biglandular at the base. *Flowers* small, monœcious or dioecious, panicled or racemed; perianth simple. *Male sepals* 4-6, concave, imbricate; disk 4-6-lobed; stamens 10-30; filaments mostly free; anther-cells diverging, adnate to the broad connective which is continuous with the filaments; pistillode 0. *Female sepals* 5-6, lanceolate, sometimes accrescent in fruit; disk almost entire. *Ovary* 3-celled; ovule solitary in each cell; style long, stout, 2-fid; stigmatic surfaces not fimbriate. *Capsule* of 3 2-valved, crustaceous cocci. *Seeds* ovoid; albumen fleshy; cotyledons flat, broad.

*Flowers monœcious* :

Stamens 15-20 :

Female perianth segments not accrescent in fruit, pubescent. ... ... 1. *B. montanum*.

Stamens 14 :

Female perianth segments accrescent in fruit, glabrous. ... ... 2. *B. Meeboldii*. 
Flowers dioecious:—
Leaves uniform:—
   Calyx accrescent:—
      Ovary glabrous:—
         Petiole 1-2 in. long. . . . 3. B. sinuatum.
      Ovary strigose:—
         Petiole 2-4 in. long. . . . 4. B. calycinum.
   Calyx not accrescent:—
      Lateral nerves 8-16 on either half:—
         Sepals ovate-lanceolate:—
            Herb. . . . . . . . . . 5. B. micranthum.
         Lateral nerves 5-8 on either half:—
         Sepals lanceolate:—
            Undershrub. . . . . . . 6. B. suffraticosum.


A sparingly branched stout undershrub. Bark brownish, fairly smooth. Leaves very variable, 2-7 by 1-4 in. (the lower leaves often much larger) lanceolate, ovate-oblong or broadly ovate, irregularly sinuate, dentate, sometimes 3-5 lobed, acute or acuminate, coriaceous, glabrous, dark green above, minutely hairy beneath; lateral nerves 5-7 on either half; base rounded, cuneate or shallow cordate, biglandular; petiole sometimes as long as the blade; stipules of 2 glands. Flowers monœcious. in numerous axillary racemes or short panicles, all male or a few females below. Male calyx-segments almost glabrous, sub-orbicular, membranous, finely mottled; disk of 6 glands; stamens 15-20. Female calyx-segments ovate-lanceolate, pubescent (not accrescent in fruit); disk entire. Ovary hairy. Capsule 3-5 in. long, obovoid, 3-lobed.

NOWGONG, DARRANG, KAMRUP, GARO HILLS, KHASI & JAINITIA HILLS.

Flrs. & Fr. Throughout the year.


Shrub 6-8 ft. high; branches fistulose, terete; young shoots glabrous. Leaves 4·3-6 by 1·2-2 in., oblong-lanceolate, caudate-acuminate, sinuately dentate, membranous, sparsely sub-setulously pilose on both sides; lateral nerves
7-9 on either half; base acute or rounded, biglandular. 
*Flowers* monoecious. *Male* inflorescence axillary; peduncles 1·5-4 in. long, slender; flowers 1·15 in. across; pedicels capillary, 0·09 in. long; sepals orbicular, glabrous; stamens 14; disc glandular. *Female* inflorescence 1·5-3 in. long; flowers 0·05-12 in. across, somewhat bluish; pedicels capillary, 0·09 in. long; sepals 5, 0·09 in. long, lanceolate, acute, glabrous, accrescent. recurved; disc annular, hypogynous; *Ovary* glabrous; style short, rather thickened, bipartite. *Capsule* glabrous, tridymous, 0·25 by 0·17 in.

MANIPUR (3,500-4,5000 ft.). (Pflanzenreich IV. 147, VII. p. 414).


A shrub, almost glabrous. *Leaves* 6-8 by 1·5-3 in., ovate-oblong or narrow-oblong, sinuate, toothed, often 3-5-lobed above the middle, acuminate, coriaceous, glabrous; base biglandular. acute or rounded; petiole 1-2 in. long (upper leaves almost sessile). *Flowers* whitish, dioecious; racemes interrupted. *Male flowers* in long narrow racemes; calyx-segments 4-5, orbicular, membranous, glabrous; stamens 20. *Female flowers* calyx-segments 5, ovate-lanceolate, glabrous, unequal. *Ovary* glabrous; fruiting calyx accrescent.

UPPER ASSAM, N. E. F. TRACT.

Flrs. 10. Fr. Cold season.


A shrub; young parts finely pubescent. *Leaves* 6-10 by 2-4 in., elliptic, obovate or oblong, acuminate, serrate, sinuately toothed, coriaceous, glabrous above, finely pubescent beneath; lateral nerves 10-14 on either half; base acute or rounded, biglandular or bi-auriculate; petiole 5-3·5 in. long. *Flowers* dioecious, panicled. *Male flowers* panicles much branched, longer than the leaves, long peduncled; bracts minute or obsolete; calyx-segments orbicular, concave, membranous; disk of fleshy glands; stamens 20. *Female flowers* panicles shorter, corymbiform; bracts leafy; calyx-segments 5, linear-lanceolate, accrescent in fruit. *Ovary* strigose. *Capsule* 1·3 in. across.
UPPER ASSAM, N. E. F. TRACT, KHASI & JAJNTIA HILLS, (5,000 ft.).

Flrs. 9. Fr. 12.


A slender herbaceous bush; young parts finely pubescent. Leaves 3-5 by 5-2 in., lanceolate or oblone, acuminate, sinuate-toothed, coriaceous, membranous, glabrous; lateral nerves 8-16 on either half; base 2-glandular, acute or rounded. Flowers dioecious, panicked; pedicels capillary. Male flowers sepals orbicular, hyaline; disk of fleshy glands; stamens about 16. Female flowers sepals ovate-lanceolate. Capsule sub-globe, 3 in. across, smooth, tridymous.

KHASI & JAJNTIA HILLS, (4-5,000 ft.).

Used as vegetable.

Flrs. 6-9. Fr. Cold season.


An undershrub; stem woody, rhizomatous. Leaves 3-5 by 1-2 in., lanceolate or elliptic, caudate-acuminate, sinuately dENTICULATE or sub-incisely dentate, membranous, glabrous; lateral nerves 5-8 on either half; base acute, biglandular; petiole 4-1.6 in. long, slender. Flowers dioecious. Calyx not accrescent, segments lanceolate, acuminate, 8-1.2 in. long. Capsule 3 by 16 in., glabrous, tridymous; pedicel 2-5 in. long, erect.

MANIPUR, (5,300 ft.). (Meebold No. 7437). (Pflanzenreich IV, 147, VII, p. 414).

36. ENDOSPERMUM Benth.


A tree. Bark greyish, fairly sessile; blaze pale yellow with brown granules. Leaves 2.7-5 in., alternate, broadly ovate or sub-ornicular, often sub-peltate, obtuse, entire, coriaceous, glabrous, puberulous on the nerves beneath; basal nerves 3-5; lateral nerves (above basal) 3-5 on either half.
arcuate, prominent beneath; base rounded or truncate with 2 large glands beneath at the apex of the striate petiole which is 1-5 in. long. Flowers small, dioecious, in long axillary or lateral, simple spikes or racemes, perianth simple. Male flowers sub-sessile, clustered; calyx globose; segments 4, unequal, valvate; disk shortly lobed; stamens 6-10 on a convex or conical receptacle; filaments short; anthers didymous. Female flowers solitary, pedicelled; calyx 5-toothed; disk obscure. Ovary 2-3-celled; ovule 1 in each cell. Fruit didymous, tubercular, about ½ in. across, separating into 2 indehiscent cocci. Seeds globose; testa rugose.

Common throughout the province.
Flrs. 4-5. Fr. 7-8.

37. SAPIUM P. Br.
Trees and shrubs, usually with milky juice. Leaves alternate, entire, serrate or toothed, penninerved; petiole often biglandular at the summit. Flowers monœcious, in terminal, simple or panicked spikes or racemes; males above several to each bract; females solitary, lower down or in separate spikes; perianth simple. Male flowers calyx-segments 2-3; stamens 2-3; filaments free; anther-cells distinct, parallel. Female flowers calyx-segments 3. Ovary 2-3-celled, ovule 1 in each cell; styles free or connate at the base, spreading or recurved, undivided. Capsule crustaceous, fleshy or pulpy, rarely woody, ultimately 3-valved. Seeds globose or ovoid (not carunculate) usually long, attached to the columella; albumen fleshy; cotyledons flat, broad.

Inflorescence androgynous:
Male calyx truncate, sub-irregularly 2-3-fid:
Petiole-apex glandular:
Leaves entire, orbicular, ovate or sub-rhombic (1-2·8 in. long).
Leaves long, ovate (2-4·8 in. long).

Petiole-apex not glandular:
Leaves entire, long petiolate, ovate or ovate-lanceolate.

Inflorescence unisexual:
Male calyx bifid; female 2-3 partite:
Leaves long, elliptic or oblong-lanceolate, serrate (5·6-7·2 in.).

1. S. Sebiferum.
2. S. Eugeniefolium.
3. S. Baccatum.
4. S. Insigne.

A small or middle-sized deciduous tree. *Bark* greyish or greyish brown with shallow longitudinal cracks. *Leaves* 2-3 by 1.5-2 in., sub-rhomboid or orbicular-avate, acuminate, entire, sub-coriaceous, glabrous, glaucous beneath; petiole as long as the blade, biglandular at the apex. *Flowers* greenish yellow; anthers exserted. *Ovary* glabrous; style connate at the base; stigma recurved. *Capsule* 3-5 in. across, sub-globose, shortly pointed. *Seeds* 3, enclosed in an arillus of white fatty substance.

A native of CHINA, cultivated. The white fatty substance enclosing the seeds (vegetable tallow) is separated by boiling in water and made into candles in China and Japan. Wood is even-grained. Weight 32 lbs. per c.ft.

Frs. 6-8. Fr. 10-12.


A middle-sized tree (50'/60''). *Bark* greyish, fairly smooth with horizontal wrinkles, 25 in. thick; inside light brown and fibrous, mottled; wood white. *Leaves* 2-6.5 by 1-2.5 in., ovate or elliptic, acute or sub-acute, rather sub-coriaceous, entire, glabrous, often glaucous beneath; lateral nerves 6-10 on either half; base rounded; petiole 1-4 in. long, biglandular at the apex. *Racemes* dense, 3-4 in. long. *Capsule* sub-globose, 4.5 in. across, woody. *Seeds* globose.

Common throughout the province. Endi silk worms feed on the leaves.

Frs. 5-6. Fr. 10-1.


A middle-sized or large evergreen tree (90'/120''), glabrous. *Bark* greyish or greyish brown, closely vertically
fissured, 2-4 in. thick; inside cream-coloured or light chocolate in old trees. *Leaves* young orange coloured, old yellowish, 2-6 by 1-4 in., ovate or ovate-lanceolate, acuminate, entire, sub-coriaceous, glabrous above, glaucous beneath; lateral nerves 8-12 on either half; costal nerve with a gland about half way; base rounded; petiole red, 1-4-5 in. long. *Flowers* in spiciform panicled racemes, minute, yellowish-white; bracts ovate, acute, biglandular. *Stamens* 2, included; anthers red, usually didymous. *Stigma* revolute. *Fruit* reddish, berry-like, 3-5 in. across.

Common throughout the province.

The wood is used for packing boxes. The fruit is eaten greedily by pigeons.

Flrs. 4-6. Fr. 8-11.


A middle-sized, often a large deciduous tree, glabrous. *Bark* grey corky, deeply reticulately cracked; inside brown, coarsely fibrous with copious milky juice. *Leaves* often crowded towards the ends of branchlets, 5-12 by 2-3 in. (Assam specimen 1-4 by 5-1-5 in.) elliptic or oblong-lanceolate, acuminate, crenate-serrate, soft, glabrous; lateral nerves 7-16 on either half, slender; base acute, often unequal sided; petioles 1-2 in. long, biglandular at the apex. *Spikes* terminal, fleshy, unisexual. *Male flowers* sessile, in rounded clusters subtended by 2-fleshy ovate green bracts; sepals 2, orbicular, concave; stamens 2; filaments short. *Female flowers* sessile or almost so; sepals ovate, acuminate. *Ovary* glabrous; style short, slightly connate at base. *Capsule* ovoid, 3-5 in. across, numerous on a fleshy rachis.

DARRANG, KAMRUPT, NOWGONG.

Flrs. Cold season. Fr. Hot season.

38. **EXCOECARIA** Linn.

Trees or shrubs, glabrous with acrid milky juice. *Flowers* dioecious or monoecious, in lateral axillary or terminal unisexual or androgy nous spikes or racemes. *Parianth* simple; male 1-3 in each bract, 2 bracteolate; females at the base of the racemes or in separate racemes, rachis with large
glands. **Male flowers** sepals 3, small, sub-equal; disk 0; stamens 3; filaments free; anthers didymous; cells globose, distinct, contiguous. **Female flowers** calyx 3-partite. **Ovary** 3-celled; ovules 1 in each cell; styles short, connate below, spreading and recurved above, entire. **Capsule** of 3 cocci, separating from the columella with elastically twisted valves. **Seeds** sub-globose or 3-gonous; strophiole 0; albumen fleshy; cotyledons broad, flat.

Leaves alternate:—

Spikes androgynous:—

Leaves membranous, serrate. .. .. 1. *E. acerifolia*.

Leaves opposite:—

Spikes unisexual:—

Leaves coriaceous, usually entire. .. 2. *E. oppositifolia*.

### 1. **Excoecaria acerifolia** F. Didrichs. Vern. Dieng-Blei-khlaw, Kh.

A shrub. **Bark** greyish smooth with scattered lenticels; wood whitish. **Leaves** alternate, 2·5-7·5 by 1-2 in., elliptic-lanceolate or oblong, acuminate, crenate-serrate, membranous, glabrous, deep glossy green; lateral nerves 6-10 on either half; petiole ·2-·5 in. long. **Spikes** androgynous. **Capsule** ·5-·6 in. across, 2-3-lobed. **Seeds** ovoid, smooth ·2 in. long.

**Khasi Hills**, (4,500 ft.).

Flrs. 3-7. Fr. 7-12.


A small tree (50′/18″′). **Bark** greyish-white, ·25 in. thick; blaze reddish; wood whitish. **Leaves** opposite, 4-13 by 2-4 in., lanceolate or narrow-oblong, acuminate, entire or sub serrate, coriaceous, glabrous; lateral nerves 12-20 on either half, conspicuous beneath. **Spikes** unisexual; male spikes slender, terminal, 4-6 in. long; bracts entire, 1-flowered; sepals toothed. **Female flowers** sepal free; base auricled. **Female flowers** solitary. **Fruit** orbicular.

The acrid milky juice is said to be violently poisonous and corrosive.

Flrs. 4. Fr. 12.


The following description is given from the field notes of the late Rai Bahadur U. N. Kanjilal:—

A tree (30'/28''). Bark grey, with very fine vertical fissures, 2 in. thick; inside white but reddish near cambium; wood white; milky juice copious. *Leaves* alternate, 6-13 by 3-5-7 in., broadly oblong or rotundate, acute, obtuse or shortly acuminate, entire, coriaceous, glabrous; base rounded or obtuse; lateral nerves 12-15 on either half, almost parallel, very prominent beneath; petiole 4 in. long. *Inflorescence* terminal; flowers unknown. *Capsule* inflated, 1-5-2 in. long. *Seed* globose, brownish, 6 in. across.

This is a new species which could not be matched either at Sibpur or Kew. Flowering specimens are wanting, but an attempt is being made to collect them.

Pasighat (580 ft.). (N. E. F. TRACT). Sheet no. 3193 of U. N. Kanjilal. Also collected at Parashuramkunda by R. N. De.

Fr. 12 (mature).

**39. ACALYPHA** Linn.

Herbs, shrubs or trees. *Leaves* alternate, usually crenate or toothed. *Flowers* minute, usually monoecious, in axillary or terminal racemes or female 1-2 in pedunculate solitary bract; male ebracteate; perianth simple. *Male* sepals 4, valvate; disk 0; stamens usually 8 on a convex receptacle; filaments short; anther-cells divaricate; pistillode 0. *Female* sepals 3-4, minute, imbricate. *Ovary* 3-celled: one ovule in each cell; style filiform, long, lanceolate or fimbriate. *Capsule* of 3 minute 2-valved, crustaceous cocci. *Seeds* sub-globose; albumen fleshy; cotyledons broad, flat.

Female bracts not solitary:—

<table>
<thead>
<tr>
<th>Bracts concealing the capsule:—</th>
<th></th>
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<tbody>
<tr>
<td>Bracts obscurely toothed, almost truncate,</td>
<td>1. A. indica.</td>
<td>2. A. brachystachya.</td>
</tr>
<tr>
<td>somewhat 3-nerved.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bracts 3-lobed, obscurely 7-nerved.</td>
<td></td>
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</tbody>
</table>

**1. Acalypha indica** Linn.

An annual. *Leaves* 1-3 by 8-2 in., ovate or rhomboid-ovate, acute or obtuse, crenate-serrate, membranous, glabrous,
somewhat 3-nerved at base which is cuneate; petiole as long or longer than the blade. Flowers of male and female in axillary spikes, the male upper most and few. Male flowers minute, followed by a tuft of sterile flowers; bract 2-3 in. long, leafy, broad, crenate, 3-5 flowered.


Flrs. & Fr. 7-11.

2. Acalypha brachystachya Hornem.

A herbaceous slender flaccid annual. Leaves 1-3 by 6-1.8 in., ovate, acute or acuminate, crenate-serrate, membranous, hispid, obscurely 5-7-nerved at base which is shallow-cordate or rounded; petiole 8-2 in. long, very slender. Flowers usually monœcious, in axillary short spikes; bract 3-5-lobed, 15-3 in. Calyx in male flowers of 4 minute valvate membranous lobes, in female of 3-4 imbricate lobes. Petals 0. Stamens about 8; filaments short, free; anther-cells distinct, divaricate. Ovary 3-celled. Capsule hispid, 1-2 in. long. Seeds globose, 0.06 in. across.


Flrs. & Fr. 6-11.

40. CLAOXYLON A. Juss.

Claoxylon khasianum Hk. f.

A shrub or small tree. Leaves 4-10 by 3-8 in., alternate, elliptic or oblong-lanceolate, acuminate, obscurely serrate or toothed, membranous, scaberulous when young, glabrous when mature; lateral nerves 6-8 on either half, quite distinct; transverse veins remote, more or less parallel; base rounded or obtuse; petiole 1-4 in. long. Flowers minute, sessile, usually dioecious; racemes hoary, 1-3 in. long. Male flowers calyx-segments 3-4, valvate; petals 0; disk 0; stamens numerous inserted on central receptacles with minute glands or scales; filaments free, mixed with very small scales; anthers erect; cells distinct, connate at the base only. Female flowers ovary 3-celled; styles short, entire, plumose; ovules 1 in each cell. Fruit of 1-3 globose, membranous, hoary
carpels, 0.5 in. across. Seeds 0.25 in. across; testa crustaceous; cotyledons broad, flat; albumen fleshy.

N. E. F. TRACT, NAGA HILLS, CACHAR and KHASI & JAIN'TIA HILLS (4,000 ft.).

Flrs. 2. Fr. Rainy season.

C. longipetiolatum Kurz.

It is a shrub 10-12 feet high with thick fleshy branches.

KHASI & JAIN'TIA HILLS.

(U. N. Kanjilal’s No. 6143. There is only a fragmentary specimen in the herbarium which matches with C. longipetiolatum Kurz.).

C. leucocarpum Kurz.

Leaves broadly ovate, 10-12 in. long, and as broad; base 3-nerved; petiole 3-8 in. long.

(There is only a leaf specimen in the herbarium. U. N. Kanjilal’s No. 2846 which matches with C. leucocarpum Kurz.).

Mercurialis leiocarpa Sieb et Zucc.

DELEI VALLEY (Kingdon Ward 8078) 7-8,000 ft.

Flrs. 4.

41. ALCHORNEA Swartz.


A shrub or a small tree; young parts minutely pubescent. Bark greenish grey. 0.06 in. thick, greenish-yellow; inside soft. Leaves 3-8 by 1.5-8 in., alternate, orbicular or broad-ovate, acuminate, dentate or serrate, membranous, dotted, pubescent on the nerves; lateral nerves 4-6 on either half; base truncate, rounded or cordate; petiole 5.5-5 in. long. Flowers small, clustered, dioecious or monoecious; perianth simple; bracts minute. Male flowers calyx globose; segments 2-4, valvate; stamens 5-8. Female flowers sepals 3-4, imbricate. Ovary minutely tubercled; style free. Capsule finely pubescent, 3-lobed, 0.5-6 in. long, with purplish tubercles.

NOWGONG, N. C. HILLS. SYLHET and KHASI & JAIN'TIA HILLS (3-5,000 ft.).

Flrs. 5-7. Fr. 8-11.

A. rugosa Muell Arg.

An undershrub. Leaves 6-10 by 2-5 in., oblanceolate acuminate, glandular-serrate. Capsule tridymous, glabrous. LUSHAI HILLS.
A. mollis Muell. Arg.

A small tree; young parts finely pubescent or tomentose. Leaves 4-6 in. across, more or less orbicular, cuspidate, dentate or serrate, pellucid-punctate; base rounded or cordate, with 2 large glands; petiole terete, stout, 2-6 in. long; stipules small, subulate. Male racemes slender, 4-6 in. long; calyx membranous. Female racemes 4-6 in. long; calyx eglandular; sepals lanceolate, pubescent. Ovary tomentose; style free. Capsule globose, obscurely 3-lobed, pubescent. Seeds rugose, dorsally compressed.


42. TREWIA Linn.


A middle-sized deciduous tree; young parts deciduous-tomentose. Bark smooth, greyish or brownish, with wrinkles; inside light pinkish, faintly striated. Leaves 2-8 by 2-5 in., opposite, broadly ovate-cordate, acuminate, entire, subcoriaceous, glabrescent; lateral nerves 4-6 on either half; base cordate or truncate; petiole 5-3 in. long; stipules minute, acute, caducous. Flowers dioecious, greenish-yellow; male in long racemes; pedicels short, jointed; female in long peduncles (about 1-3 in.), perianth simple. Male flowers 3-5 in. across; sepals concave, valvate; stamens numerous, free. Female flowers solitary or 2-3 together: sepals 3-5, broad, imbricate, caducous. Ovary woolly, 3-4 celled; style 5-7 in. long, yellow, stigmatic throughout. Fruit woody, globose, 1-1.5 in. across, smooth, with pale dots; endocarp crustaceous. Seeds smooth, polished, blackish; albumen fleshy.

Common throughout the Province.

Wood white, soft, fairly elastic; weight 28-29 lbs. per cft. used for drums in U.P.; suitable for matches.

Frs. 1-3. Fr. 7-8.
43. **Mallotus** Lour.

Trees or shrubs. *Leaves* opposite or alternate, entire or 3-lobed, penninerved or 3-7-nerved, sometimes peltate, often gland-dotted beneath and sometimes with glandular spaces at the base above. *Flowers* dioecious or monoecious, in axillary or terminal simple or panicled racemes or spikes; perianth simple; male usually fascicled; female solitary (or few-?) under each bract. *Male flowers*—calyx globose or ovoid, separating into 3-5 valvate segments; disk 0; stamens numerous, crowded on the flat or concave receptacle; filaments free; anther-cells parallel, separated by a wide connective. *Female flowers*—calyx spathaceous or valvately 3-6-cleft or partite; disk 0 or small. *Ovary* 2-4-celled; ovule solitary in each cell; style spreading or recurved above, entire, plumose or papillose. *Fruit* a capsule usually, glandular, of 2-3-(rarely 4) two-valvate cocci, tubercled, echinate, paleaceous or smooth. *Seeds* ovoid, oblong or globose; testa crustaceous; albumen fleshy; cotyledons flat.

Capsule echinate or tubercled:—
Leaves orbicular or broadly ovate, usually alternate:—
Leaves peltate:—
Leaves 3-5-nerved:—
  Capsule tubercled. . . . . . 1. *M. albus*.
Leaves 7-9-nerved:—
  Capsule hairy and prickly. . . 2. *M. Roxburghianus*.
Leaves not peltate:—
Leaves yellow dotted beneath; base usually truncate, rarely sub-cordate:—
  Capsule tomentose. . . . . . 3. *M. nepalensis*.
Leaves eglandular beneath; base usually acute:—
  Capsule prickly. . . . . . 4. *M. khasianus*.
Capsule smooth:—
Baseal nerves 3:—
Leaves 4-9 in. long:—
  Capsule 3-lobed. . . . . . 5. *M. philippinensis*.
Leaves 2-4 in. long:—
  Capsule didymous. . . . . . 6. *M. repandus*.

Dieng-lakliu, Dieng-thai-rong, Kh.; Lutung-har-arong, Mik.; Teng-niam-ching, Naga; Marli, Sylh.; Khurchup, Tipp.

A middle-sized tree; young parts stellate-tomentose. Bark greyish white, warty, with fine vertical lenticels, 16-2 in. thick; blaze greenish-brown. Leaves mostly alternate, 4-12 by 2-8 in., broadly ovate or sub-orbicular, acuminate, entire or sinuate-toothed, coriaceous, glabrous above, whitish or rusty-tomentose beneath, 3-5-nerved at base; lateral nerves 3-6 (above basal); base narrowly peltate or truncate; petiole 1-8 in. long. Flowers dioecious, in axillary and terminal pyramidal panicles. Male flowers clustered; buds globose; anther-cells parallel. Female flowers solitary; calyx 4-5-cleft. Ovary densely stellate-hairy; styles 4-5, papilllose. Capsule usually of 4 cocci, muricate, with soft short tomentose processes. Seeds blackish-brown, minutely tubercled.

Common throughout the Province.

Flrs. 2-3. Fr. Cold season.


.. A shrub or small tree. Bark greyish or greyish-brown, dark greenish-brown underneath the corky layer; inside finely fibrous. Leaves 3-7 by 2-6 in., alternate, peltate, ovate or sub-orbicular, long-tailed or acuminate, remotely glandular toothed, coriaceous, pubescent with simple and stellate hairs on both surfaces, with scattered yellow gland dots beneath; 8-10 nerves radiate from the extremity of the petiole, and 4-5 on either half of the midrib above the basal; base rounded; petiole 1-3·5 in. long. Racemes stout, 6-12 in. long. Male flowers-calyx segments 5, valvate, reflexed in open flower; disk 0; stamens 30 (33?); anthers 2-celled; pistillode 0. Female flowers-calyx segments lanceolate. Capsule 5 in. across, 3-lobed, 3-seeded, covered with hairy processes and yellow resinous glands; young fruit echinate. Seeds smooth, subglobose.
KAMRUP, GOALPARA, NOWGONG, N. C. HILLS, CACHAR
and KHASI & JAIN'TIA HILLS.

Flrs. 12. Fr. 5.

3. Mallotus nepalensis Muell. Arg. Vern. Dieng-
lakhar, Kh.

A small tree (30'/30''); young parts rusty-tomentose. Bark greyish-brown, shallowly reticulately furrowed, 25 in. thick; inside light red, gradually cream-coloured towards the cambium layer, with faint or irregular transverse white streaks. Leaves 3-8 by 2-7 in., opposite or alternate, broad-
avate or sub-orbicular, caudate-acuminate, entire, sub-
coriaceous, stellate-tomentose beneath, ultimately glabrescent,
yellow-dotted beneath; lateral nerves 3-7 on either half above the basal; base 3-nerved, truncate, rarely sub-cordate;
petiole 1-7 in. long. Male racemes very long; flowers large;
female shorter, stout. Male flowers 25 in. across; stamens numerous. Female flowers sepals narrow. Ovary shaggy-
tomentose. Capsule 5 in. across, tomentose, bristly, densely
crowded.

KHASI HILLS (4-5,000 ft.).

Flrs. 6. Fr. End of rainy season.

4. Mallotus khasianus Hk. f.

A small tree, glabrous (except the inflorescence); young parts stellate-tomentose. Leaves 4-10 by 2-3·5 in., elliptic,
ove-oblong or lanceolate, caudate-acuminate, entire or
sinuate, toothed, thinly coriaceous, eglandular beneath; lateral
nerves 6-9 on either half, slender; base rounded or broadly
cuneate; petiole 7-1·5 in. long; stipules triangular, lanceo-
late, stellately tomentose. Male flowers clustered in racemes,
which are 3-6 in. long; bracts broad-ovate; calyx tomentose;
segments 3, unequal; stamens 40-50. Female flowers pedicel-
led, in long slender racemes (6-8 in. long). Capsule 75 in.
across, covered with slender prickles. Seeds 3 in. long. sub-
globose, brown, shining.

KHASI HILLS (3-4,000 ft.).

Flrs. & Fr.

A small evergreen tree, occasionally a mediocre; young branches rusty. *Bark* thin, greyish-brown or darkish-grey, somewhat rough, with wrinkles about 3 in. apart; blaze red, with white vertical lines; wood very hard, cream-coloured. *Leaves* 3-7 by 1·5-2·5 in., alternate, ovate, ovate-oblong or lanceolate, acuminate, entire or slightly dentate, glabrous above, pubescent beneath and with numerous close-set orbicular red glands; lateral nerves 3-7 on either half (above base), 3-nerved at base; reticulation distinct; base rounded or acute; petiole 5-3·5 in. long, rusty-pubescent with a pair of glands at the junction with the blade. *Inflorescence* brown or red. *Flowers* small, dioecious. *Male flowers* clustered in erect terminal spikes which are often panicked, sessile or almost so; bracts broad-ovate, acute; sepals 4 (rarely 5), lanceolate, acute; stamens numerous; anther-cells globose. *Female flowers* usually solitary, sessile or nearly so in short spikes; sepals almost free, 3-4, ovate-lanceolate. *Ovary* 3-celled, with red glands; style 3, simple, papilllose. *Capsule* 3·5 in. across, 3-lobed when ripe, covered with a crimson powder, consisting of stellate hairs and grains of resinous substance. *Seeds* globose, black, 16·2 in. across.

Common throughout the area.

Wood used for fuel. Weight 48 lbs. per cft.

The crimson powder *Kamela* which covers the ripe fruit is used for dyeing silk and is also used medicinally and is considered efficacious for tape-worm.

Flrs. 8-11. Fr. 3-5.


A large woody climbing or straggling bush; arrested branchlets spinescent; young parts fulvous-woolly-tomentose. *Leaves* alternate, 1·5-4 by 1·3 in., broadly deltoid or rhomboid-ovate, acute or shortly acuminate, subentire or remotely
sinuate toothed, membranous, glabrescent when mature, yellow gland-dotted beneath; base 6-nerved, truncate, retuse or cuneate; petiole ·5-2 in. long. Flowers dioecious, tomentose. Male flowers clustered in racemes 2-6 in. long, which are crowded at the ends of shoots or axillary; bracts linear-lanceolate; calyx globose; segments 3-5, almost free, ovate or elliptic-acute; stamens numerous (50-60). Female flowers in shorter racemes, about 3 in. long; calyx campanulate; in shorter racemes, about 3 in. long; calyx campanulate; segments 4, linear-lanceolate or oblong, acute. Ovary glandular, densely stellate-tomentose, 2-celled; styles 2, plumose, laciniate, connate below. Capsule of 2 cocci, ·4 in. across, didymous, crowned with persistent stigma, densely stellate. fulvous and glandular. Seeds globose, black, shining, ·16-·2 in. across.

EASTERN DUARS (ASSAM), SIBSAGAR, NOWGONG and KHASI & JAITIA HILLS.

Frs. 2-3. Fr. 3-4.

44. MACARANGA Thouars.

Trees or shrubs. Leaves alternate, often large and peltate, entire or lobed, more or less glandular beneath; basal nerves 3 or more. Flowers small, usually dioecious, in axillary panicles or racemes, bracteate; perianth simple. Male flowers minute, in clusters; calyx globose or obovoid; segments 3-5, valvate; stamens central 1 or more (often 10-30); filaments short, free; anthers terminal, 3-4-celled; pistillode 0. Female flowers one or few to each bract; calyx-segments 2-4. Ovary 1-2-celled (rarely 1-celled by abortion); ovule solitary in each cell; style entire. Fruit a small capsule of 1-5 naked or echinate 2-valved cocci, often with glandular or waxy coat. Seeds globose; testa crustaceous; albumen fleshy; cotyledons broad, flat; embryo small.

Leaves peltate:--

Leaves denticulate:--

Ovary 2-celled:--

Stamens 6-30:--

Capsule didymous. . . . . 1. M. denticulata.
Leaves usually entire:—
Ovary mostly 1-celled:—
Stamens 6-10:—
Capsule as a rule globose. .. 2. M. indica.
Leaves not peltate:—
Stamens 15-20:—


A middle-sized evergreen tree, often gregarious; young parts rusty-tomentose; stem fluted. Bark greyish or greyish-brown, with horizontal wrinkles, 3 in. thick, dark brown or reddish inside, somewhat granular. Leaves peltate, 3-12 by 2.5-10 in., broad-ovate, acuminate, denticulate (when young) or entire, sub-coriaceous, glabrescent above, glaucous and dotted with numerous red minute orbicular glands beneath; basal nerves 5-7, radiating; lateral nerves 10-12 on either side of midrib, slightly arcuate; tertiary nerves parallel; base rounded, truncate or cordate; petiole 2-8 in. long; stipules small, fugacious. Male panicles slender, 4-6 in. long, each bract subtending a cluster of 5-8 pubescent flowers; calyx-segments 2-3; stamens 6-30; anthers 4-lobed. Female panicles shorter; calyx-segments 3-4. Ovary 2-celled; style short. Capsule 25 in. across, blackish, didymous, clothed with minute waxy orbicular glands.

Very common throughout the Province.
Very good fire wood. Leaves buffalo fodder.

Flrs. 2-3. Fr. 5-7.


A middle-sized tree (62'/64''). Bark greyish, smooth, yellowish inside. Leaves peltate, 5-12 by 4-9 in., triangular-
ovate, orbicular-ovate, acuminate, obscurely denticulate or entire, thinly coriaceous, ultimately glabrous above, glabrate and clothed with viscid yellow glands beneath and minutely pubescent specially on the nerves; lateral nerves 3-11 on either half above the basal pairs which are pinninerved; petiole 2-12 in. long, glaucous with a pair of glands at the summit; stipules 5 in. long, ovate, acuminate. Male panicles branches zigzag; flowers pubescent, somewhat clustered; bracts fleshy with glandular appendages; sepals ovate, 2-3; stamens 6-10. Female panicles smaller, hairy; flowers pedicelled; bracts small, glandular; calyx 4-cleft. Ovary mostly 1-celled; stigma spurred, densely clothed with orbicular waxy glands. Capsule 16-2 in. across, globose, rarely didymous. Seeds globose.

Common throughout the Province.

Flrs. Hot season. Fr. Cold season.


A large tree (80'/60''); stem slightly fluted. Bark blackish, smooth, with large white blotches, 16 in. thick, reddish-brown inside. Leaves 3-6.5 by 1-2.5 in., (not peltate) elliptic-oblong or lanceolate, acuminate, entire, thinly coriaceous, glabrous, dotted with minute orbicular scales beneath; lateral nerves 7-10 on either half, arcuate; base rounded; petiole 5-2 in. long. Flowers very small, in clusters. Male bracts triangular, acuminate; sepals orbicular; stamens 25-20; anthers 4-celled. Female bracts broad; sepals lanceolate. Ovary echinate. Capsule globose, 3-5 in. across, echinate.

LAKHIMPUR (Makum Range). (Rai Bahadur U. N. Kanjilal's No. 4116).

Flrs. 2-4. Fr. Rainy season upto December.

U. N. Kanjilal mentions M. pustulata King in his field notes, but there is no record either in Sibpur or in Forest Herbarium, Shillong.
45. CLEIDION Blume.


An evergreen middle-sized (60′/35″) tree, glabrous. Bark ashy-grey, 12 in. thick; inside light chocolate, granular, somewhat mottled. Leaves 2·5-9 by 1-4 in., alternate, elliptic-lanceolate, acuminate, serrate or sub-entire, coriaceous, glabrous, dark green above, paler beneath; lateral nerves 7-10 on either half, prominent beneath; base acute; petioles 5-3 in. long, swollen and geniculate. Flowers small, monœcious or dioecious; perianth simple. Male flowers in long axillary racemes; calyx globose; sepals 3-4, lanceolate, valvate, reflexed, glabrous; stamens numerous on a conical receptacle; anthers 4-celled. Female flowers solitary, axillary; peduncles 2-3·5 in. long; sepals 3-5, imbricate, thick, ovate. Ovary 2-3-celled; ovule solitary in each cell; style 2, very long, each again divided into 2 filiform arms. Capsule large, about 1 in. across, didymous, on peduncles of 2-4 in. in length and swollen or thickened above. Seeds grey mottled-brown; albumen fleshy; cotyledons flat.

SIBSAGAR, N. C. HILLS, N. E. F. TRACT, LAKHIMPUR, DAR-RANG. GARO HILLS, NOWGONG and KHASI & JAINTIA HILLS, MANIPUR.

Flrs. Cold season. Fr. Hot season.

46. HOMONOIA Lour.


A rigid evergreen gregarious shrub or small tree, with habits of willows; young parts pubescent. Bark dark grey or brown, rough. Leaves 3-7 by 5-8 in., linear-oblong or linear-lanceolate, acute, entire or somewhat glandular toothed towards the apex, glabrescent above, papillose on both surfaces, clothed with scattered and numerous round scales beneath; lateral nerves many, about 10-30 on either half, prominent beneath; base acute or rounded; petiole channelled, 2·5 in. long; stipules acute, subulate. Flowers dioecious, sessile, in axillary bracteate spikes 2-5 in. long;
perianth simple; bracts triangular, acuminate. Male flowers-calyx globose; sepals 3 (6?) free, elliptic or suborbicular, valvate; stamens many, in a dense globose cluster of repeatedly branching filaments; anthers red, with sub-globose cell, divaricate; connective obscure. Female flowers-sepals 5, usually imbricate, ovate, unequal, acuminate. Ovary pubescent, 3-celled; ovule solitary in each cell; style 3, plumose, connate at base. Capsule globose, \( \cdot 15 \) in. across. tomentose, of three 2-valved cocci. Seeds yellowish-brown, slightly angular at the inner face; albumen fleshy; cotyledons broad, flat.

LAKHIMPUR. N. E. F. TRACT. SIBSAGAR. KAMRUP, GARO HILLS, N. C. HILLS, GOALPARA, SYLHET and KHASI & JAINTIA HILLS (on rocks or river beds).

Frs. 3-5. Fr. Rainy season.

47. RICINUS Linn.


An evergreen soft-wooded shrub; young parts covered with a glaucous bloom. Leaves alternate, 2-9 in. across, palmately lobed, peltate, serrate, membranous; petiole stout. hollow, as long as the taves. Flowers monoeious. Stamens numerous. Ovary 3-celled; style 3, plumose, 2-fid. Capsule globose, echinate, about \( \cdot 5 \cdot 9 \) in. long, splitting into three 2-valved dehiscent cocci. Seeds with large caruncle; testa crustaceous.

Cultivated and also apparently wild throughout the Province. The seeds yield the well-known castor oil. The Endi silk worm is reared on the leaves.

Frs. & Fr. Almost throughout the year.

48. CNESMONE Blume.


A large evergreen twining shrub, tomentose with long villous hairs. Leaves alternate, 3-5 by \( 1 \cdot 5 \cdot 3 \) in., ovate-
oblong, acuminate, serrate or dentate, sub-coriaceous, tomentose on both surfaces; lateral nerves 4-6 on either half; base cordate; petiole 0.5-2 in. long; stipules ovate, persistent. Flowers greenish, monœcious, in androgynous pubescent racemes; male flowers uppermost; females lower; perianth simple; bracteoles 2. Male flowers—calyx globose; segments 3, valvate; stamens 3, alternating with calyx-segments; filaments free; anthers dorsifixed; cells sub-parallel. Female flowers large; sepals 3, velvety. Ovary 3-celled, strigose; ovules solitary in each cell; stigmatic lobes 3, connate at base in a fleshy mass, incurved, fimbriate within. Capsule 3-dymous, hispid, of three 2-valved cocci. Seeds globose, albumen fleshy; cotyledons broad, flat.

UPPER ASSAM, KAMRUP, KHASI HILLS, SYLHET & LUSHAI HILLS.

Flrs. 4. Fr. 8.

Dalechampia Kurzii Hk. f.

A prostrate or scandent shrub, sparsely hairy. Leaves deeply 3-lobed, alternate, 2-5 in. long, pubescent beneath, lobes lanceolate, sub-serrate; base cordate; petiole 1 in. long, sparsely hairy. Flowers in androgynous involucrate heads; bracts pale green, 2-3-lobed, serrulate; male perianth 4-6, valvate; stamens 20-30; female perianth 8-10, pinnatifid, hirsute. Ovary scabrid; style 0.5 in. long. Capsule of 4 globose cocci.

S. LUSHAI HILLS (2,500 ft. Wenger 327).

Flrs. 8. Fr. Cold season.

49. TRAGIA Linn.


A perennial twiner with hispid stinging hairs. Leaves alternate, variable, 1-4 by 0.5-2 in., ovate or oblong, acuminate, serrate, membranous, hispid; lateral nerves 4-5 on either half, slender; base rounded or cordate; petiole 0.2-1 in. long. Flowers monœcious, in terminal and leaf opposed androgynous racemes (male uppermost; female few, below); perianth simple. Male flowers—sepals 3-5, valvate; stamens 1-3; anther-cells contiguous, paralled. Female flowers sepal 6, imbricate. Ovary 3-celled; ovules solitary in each cell; styles free and spreading above. Capsule of 3, 2-valved
Pterococcus. 123. EUPHORBIACEÆ.

50. PTEROCOCCUS Hassk.

Pterococus corniculatus (Sm.) Pax et Hoffm.

A slender climber, almost glabrous. Leaves 2-4 by 1-2 in., ovate-oblong, caudate-acuminate, dentate; lateral nerves 3-4 on either half, arcuate; base cordate; petiole 1-1.5 in. long, biglandular at the apex. Flowers in slender androgynous racemes; bracts lanceolate, minute. Male flowers minute, fascicled above; perianth segments 4-5, valvate; stamens 8-30 on a conspicuous receptacle; filaments free, short; anthers erect; pistillode obsolete or filiform. Female flowers below male flowers; perianth-segments imbricate. Ovary 3 or 4-celled; ovules solitary in each cell; style connate in fleshy globose mass. Capsule depressed, of 4 stellate-ly spreading granulate cocci, each produced into a linear obtuse wing 2 in. long. Seeds pale, keeled, lenticular, mottled all round.

UPPER ASSAM (Jenkins, Griffith).
There is only one sheet of specimens (Malayan) in Sibpur.
Used as a vegetable in Malaya.

Codiaeum variegatum Bl.

An evergreen shrub with brightly coloured curiously shaped variegated leaves; generally known as Crotons; cultivated in gardens everywhere.
FAM. 124. ULMACEÆ.


Trees or shrubs, sap watery. Leaves alternate, simple, bifarious, often unequal-sided; stipules often caducous. Flowers unisexual or polygamous, in axillary clusters or cymes; females sometimes solitary. Perianth usually 4-5 lobed, free or united, sepaloïd. Stamens 4-5, opposite the perianth lobes, in 2 whorls. Ovary (rudimentary in male flowers) of 2 carpels, usually 1-celled (sometimes 2-celled); ovule 1, pendulous, anatropous or amphitropous; style 2, 2-fid, divergent, stigmatose on their inner faces. Fruit indehiscent, a nut, samara or drupe. Seed exalbuminous; empryo straight or curved; cotyledons folded or flat, (cystolith cells often visible on the epidermis). No laticiferous tubes.

Fruit a samara:—
Leaves serrate; lateral nerves many, straight:—
   Cotyledons flat. . . . . . . . 1. Ulmus.
Leaves entire; lateral nerves few, arcuate:—
   Cotyledons folded. . . . . . . 2. Holoptelea.
Fruit a drupe:—
Male sepals imbricate:—
   Leaves 3-nerved; stipules free. . . . 3. Celtis.
   Leaves pennis-nerved. Pistillode woolly.
   Stipules connate. . . . . . . . 4. Gironniera.
Male sepals induplicate-valvate:—
   Leaves scabrid; base 3-7-nerved; pistillode glabrous. . . . . 5. Trema.

1. ULMUS Linn.

Ulmus lancifolia Roxb. Vern. Bor-sui, Selsue, Garo, Rei-ha-thing, Kuki; Dieng-tyrsan, Khasi; Manuk, Ass.

A large deciduous tree (100'/100''). Bark greyish-brown. 3 in. thick, rough, somewhat corky, exfoliating in flakes; inside reddish, dark, hard but with the finer fibres, turning
yellowish brown; young parts hairy. *Leaves* 1-4.5 by 5-1.7 in., lanceolate, elliptic-lanceolate, bluntly acuminate, finely serrate or crenate, thinly coriaceous, glabrous; nerves elegantly reticulated; base unequal; petiole 0.05-1.6 in. long. *Pedicels* articulate. *Perianth* campanulate, 5-cleft. *Samara* about 1 in. long, stipitate, oblique, obovate or sub-orbicular, membranous.

GARO HILLS, KAMRUP, NOWGONG, LUSHAI HILLS, SIB-SAGAR and K. & J. HILLS. (upto 5,000 ft.).
Wood cream coloured. Leaves are cattle fodder.

Flrs. Cold season. Fr. 3-5.

2. **HOLOPTLEA** Planch.


A large deciduous tree (60'/108''). *Bark* dark-grey, with deep longitudinal cracks on old trees, fairly smooth on young stems; inside light brown, with concentric bands or greenish-brown or irregularly mottled with brown strands; with characteristic smell; branches lenticellate; young shoots pubescent. *Leaves* 2.5-5 by 1.2-2.5 in., elliptic-ovate or oblone, acuminate, entire, coriaceous, glabrous, glabrescent or pubescent beneath when young, minutely rugose with raised dots; lateral nerves 5-8 on either half. arcuate; base rounded or sub-cordate; petiole 3-6 in. long; stipules 2.3 in., scarious. *Flowers* green; male or bisexual in pubescent fascicles or short racemes from the leaf scars of previous year's shoots and appearing before the leaves: pedicels short, elongating in fruit. *Perianth* campanulate, 4-8-cleft. *Stamens* 8, in 2-whorls. *Ovary* stipitate. *Samara* 75-1.2 in. long, ovate or suborbicular, notched, abruptly narrowed into a stipe.

GOALPARA & GARO HILLS.

Wood yellowish-grey, moderately hard; pores small and uniformly distributed. Weight 40 lbs. per c. ft. Wood is used for carving. etc., used in building aeroplanes during the last war.

Flrs. 2-4. Fr. 5-8.
3. **Celtis** Linn.

Trees or shrubs. *Leaves* palmately 3-nerved, alternate, bifarious, entire or serrate. *Flowers* small, polygamous, solitary or cymose; male and bisexual cymes usually at the base of the shoots; female in the upper axils. *Sepal* 4-6, imbricate. *Stamens* isomorous. *Ovary* sessile on a woolly disc; style plumose. *Fruit* a small drupe, ovoid or globose; albumen 0 or scanty; embryo curved; cotyledons broad, oily, surrounding the upcurved radicle.

Drupe solitary or binate:

- Secondary nerves usually 3 on either half as strong as the basal:
  - Leaves serrate or sub-entire. *Sepals* 4-5:
  - Drupe ellipsoid or ovoid. .. .. 1. *C. australis*.
- Secondary nerves 1-3 (usually 2-3) on either half, as strong as the basal:
  - Leaves more entire. *Sepals* 4:
  - Drupe sub-globose or broadly ovoid. .. 2. *C. tetrandra*.

Drupe seriate:

- Secondary nerves very much weaker than the basal nerves:
  - *Sepals* 5:
  - Drupe narrowed at both ends. .. 3. *C. cinnamomea*.


A middle-sized deciduous tree; branchlets drooping. *Bark* bluish or greenish grey, smooth, with small horizontal wrinkles; inside white, mottled with brown. *Leaves* alternate, 1.5-5 by 0.8-2 in., ovate or ovate-lanceolate or ovate-elliptic, acuminate, serrate or entire towards the base, coriaceous, dark green and glabrous above, often scabrid, more or less pubescent beneath; basal nerves 3; secondary nerves usually 2-3 on either half, as strong as the basal; base oblique, rounded or obtuse; petiole 0.1-3 in. long; stipules 0.3 in. long, subulate, caducous. *Sepals* 4-5. *Ovary* sessile. *Drupe* ovoid or ellipsoid, 0.3 in. long, more or less rugose, woolly at the base; peduncles 0.5-2 in. long.
N. E. F. TRACT, LAKHIMPUR, N. C. HILLS and K. & J. HILLS.
Wood is tough and strong; is used for oars and other purposes. Weight 47 lbs. per c. ft. The leaves are cattle fodder.

Flrs. 3-5. Fr. 6-10.

A large tree (120'/180'') buttressed at base. Bark dark greyish-brown outside, rough with vertical close ridges, 3 in thick; inside light dark-brown, hard, fibrous in very thin layers, not mottled at all but variegated with streaks of softer tissue. Leaves 2-3.5 by 8-1.5 in., ovate or ovate-lanceolate, acuminate, crenate-serrate from near the base, sub-coriaceous, scaberulous above, softly tomentose beneath; lateral nerves 4-6 on either half as strong as the basal. Stigma sessile, 2-fid; arms recurved, brown, shaggy. Drupe solitary, white pubescent or woolly, supported by 5 pubescent strap-shaped perianth lobes; putamen brown, rugose.
N. C. HILLS.

Flrs. 3-4. Fr. 5.

A large handsome deciduous tree (100'/144''); young parts pubescent. Bark dark-grey, lenticellate, horizontally wrinkled, 3.5 in. thick, yellowish-white; inside mottled with strands of dark-brown tissues. Leaves alternate, 1.5-6 by 8-2.5 in., elliptic, ovate or ovate-lanceolate, acuminate, often caudate, serrate above the middle or sub-entire, coriaceous, glabrescent with tufts of hairs on nerve axils beneath; main lateral nerves 1-3 on either half, converging towards the apex, almost as strong as the basal pairs; tertiaryies strong, scalariform; base oblique, rounded or acute; petiole 0.05-0.5 in. long, channelled; stipules 2 in. long, linear-lanceolate, caducous. Male flowers—pedicels 1 in. long. Bisexual flowers—pedicels 3 in. long. Sepals usually 4. Ovary sessile, pilose towards the apex. Drupe sub-globose or broadly ovoid, 25-3 by 2 in., orange-red when ripe; peduncle 4-7 in. long in fruit.
Common throughout the Province, ascending up to 3,000 ft.
Ffrs. 2-3. Fr. 10-11.

**Var. Hamiltonii.**—Branchlets and leaves pubescent, drying yellowish-green (KHASI HILLS).

### 3. Celtis cinnamomea Lindl.

A middle sized tree. *Bark* grey, rough and warty, with horizontal bands of lenticels, 16-2 in. thick; inside pale yellow, mottled, dark-brown or black. *Leaves* alternate, bifarious, 2-4.5 by 1.2-1.8 in., ovate, ovate-lanceolate, caudate-acuminate, entire or shallowly serrate towards the apex, rather membranous, glabrous, 3-nerved at base; basal nerves converging towards and almost reaching the apex; secondary nerves much weaker than the basal; tertiaries and veins obscure; base oblique, rounded or obtuse; petiole 2-5 in. long; stipules 3 in. long. *Sepals* usually 5. *Drupes* 2 or several on the peduncles (7-9 in. long), ellipsoid, narrowed towards both ends, 3 by 2 in.; putamen hard, white, rugose.

GARO HILLS, SYLHET and K. & J. HILLS.

Ffrs. 1. Fr. 4-7.

### C. sinensis Pers.

A large deciduous tree; bark grey, smooth, thin; crown spreading. *Leaves* ovate, ovate-oblong, acuminate, sparsely dentate or entire, glabrescent; base acute, somewhat unequal. *Flowers* hermaphrodite. *Axillary* solitary. *Drupe* minutely ellipsoid or sub-globose, orange coloured.

Delai Valley. (Kingdon Ward 8007) 2,000 ft.

Fr. 4.

### 4. GIRONNIERA Gaud.

Evergreen trees or shrubs. *Leaves* alternate, penninerved, coriaceous; caducous; nerves impressed above, very prominent beneath; stipules sheathing. *Male flowers*—*sepals* 5, broad, obtuse, imbricate; stamens 5, erect in bud; pistillode woolly. *Female flower*—*sepals* narrower, acute; ovary sessile; style central; arms 2, filiform; ovule pendulous. *Drupe* ovoid, usually 2-keeled; endocarp hard; embryo contorted; albumen 0, scanty or copious.

Khasi.

A large evergreen tree (86’/96”) buttressed at base; branchlets lenticellate. Bark cinnamon brown, 3 in. thick, exfoliating in loose irregular overhanging flakes; inside light rosy-pink, with very fine wavy streaks of lighter coloured tissues, turning reddish-brown, very finely fibrous, in thin papery layers (light red underneath the corky layer). Leaves 2.5-7 by 8-5 in., ovate, ovate-oblong or ovate-lanceolate, acuminate, entire, coriaceous, glabrous; lateral nerves 6-14 on either half; veins elegantly reticulated; base rounded or acute; petiole 2-6 in. long. Male flowers in short axillary panicked cymes; stamens inflexed in bud; pistillode a very minute tuft of hairs. Ovary glabrous. Drupe ovoid, glabrous, 5-7 in. long, beaked, crowned by the feathery stigma.

N. E. F. TRACT.—Pasighat, CACHAR, N. C. HILLS, SYLHET and K. & J. HILLS (upto 4,000 ft.).

Wood reddish or brown, compact, fine grained (somewhat like Artocarpus), hard, smooth, takes a fine polish; pores medium-sized; medullary rays very fine and numerous. A heavy strong timber very little known in the market, but is worth considerable attention.

Flrs. 5-6. Fr. Cold season.

G. Thomsoni King in Herb Kew.

A large tree. Leaves alternate, 4-6 by 2-3 in., ovate-oblong, entire, acuminate, coriaceous, glabrous; base rounded; lateral nerves 10-12 on either half, arcuate, prominent beneath; midrib impressed above; petiole 4-6 in. long. Flowers (male) usually in axillary cymes; sepals oblong, obtuse, glabrous.

ASSAM upto 4,000 ft.

Flrs. 4-5. Fr. Later upto 10.

5. TREMA Lour.

Shrubs or trees. Leaves alternate, serrate; base often oblique; basal nerves 3-7; stipules lateral, caducous. Flowers small, green, dioecious, 1-sexual or polygamous, in axillary cymes. Sepals 4-5, usually induplicately valvate. Stamens 4-5. Pistillode small, glabrous. Ovary sessile; style 2-fid or stigma 2. Drupe small, supported by the persistent perianth;
albumen fleshy; embryo curved; cotyledons narrow; radicle up-curved, incumbent.

Basal nerves mostly 3; base oblique:—
   Leaves silky beneath:—
     Branchlets adpressed-pubescent:—
       Cymes lax. . . . . . 1. *T. orientalis*.
     Branchlets villous or tomentose:—
       Cymes dense. . . . . . 2. *T. amboinensis*.
Basal nerves mostly 5; base more or less equal-sided:—
   Leaves scabrid on both surfaces:—
     Branchlets scabridly hairy. . . . . . 3. *T. politoria*.


A small fast-growing and short-lived tree; branches and branchlets somewhat ascending; twigs adpressed pubescent. Bark thin, greenish-grey or bluish-green, smooth, with numerous reddish lenticels; blaze yellowish green. Leaves drooping, 2-6 by 1-3 in., ovate, ovate-lanceolate or ovate-oblong, caudate-acuminate, crenulate or serrulate, rather membranous, scabrid above, more or less grey or white pubescent or tomentose beneath; base oblique, subcordate or cordate; basal nerves 3-7 (principally 3); lateral nerves 3-4 on either half; petiole 2-4 in. long. Male cymes dense, sometimes lax; female cymes lax; sepals flat. Stigma papillose. Drupe 15-17 in. long.

Common throughout the province.
Wood light reddish, 28 lbs. per c.ft.

The bark is used by Garos for making a coarse mattress. The bark yields a strong fibre. The leaves are lopped for cattle fodder.

Flrs. 2-4. Fr. 6-8.

A tree (80'/90'') nearly allied to *T. orientalis*; branchlets villous or tomentose, with spreading hairs. *Bark* whitish, rough, with warts and both fine and large horizontal wrinkles, about 3 in. thick; inside finely fibrous, red with fine as well as distant broad streaks of lighter coloured tissues. *Leaves* shining, large, 3-6 by 1.5-2.7 in., ovate-oblong, caudate-acuminate, scaberulous above, pubescent or tomentose with spreading hairs & white beneath. *Male cymes* dense; style feathery.

N. C. HILLS, SIBSAGAR, GOALPARA, KAMRUP, SYLHET, DARRANG and K. & J. HILLS.

Flrs. 4-7. Fr. 9-11.

3. **Trema politoria** Planch.

A fast growing shrub or small tree. *Bark* pale-brown, smooth, dotted with lenticels; branchlets scabrid. *Leaves* 2-5 by 5-2 in., oblong, ovate-oblong or ovate-lanceolate, acute or acuminate, crenate, serrulate, membranous, scabrid and thinly hispid on both surfaces; base rounded, truncate or subcordate; petiole 2.4 in. long, channelled; stipules 3-4 in. long. *Cymes* usually not exceeding petioles. *Drupe* 1.15 in. in diameter, ellipsoid or globose, black when ripe.

GOALPARA & KAMRUP. Comes up freely on land slips.

The bark yields a strong fibre. The leaves are cattle fodder and also used like sand paper for polishing wood etc.

Flrs. 4-6. Fr. 10-11.
FAM. 125. MORACEÆ.


Trees, shrubs or herbs, often with milky latex. Leaves usually alternate, rarely opposite, simple, rarely lobed, frequently dotted (cystoliths); stipules deciduous, large, often amplexicaul, leaving an annular scar. Flowers small, monoecious or dioecious, usually cymose, sometimes becoming capitate, (spiciform in some genera) crowded on the inside or outside of fleshy receptacle; female sometimes solitary. Male and female inflorescences sometimes different. Perianth single, calycine, usually 4-merous, free or connate, often accrescent in fruit. Stamens isomerous and opposite the sepals or reduced in number, inflexed or erect in bud; anthers dehiscing (rarely erect or basal). Fruit an achene, a drupe or sub 2-valvular, often aggregated into fleshy pseudocarps or anthocarps. Seeds albuminous or not; embryo usually curved; cotyledons often unequal, the larger folding round the other.

Fruit a syncarp:—

Stamens erect:—

Flowers unisexual, minute, on the inner wall of a closed hollow receptacle which is fleshy in fruit. 1.

Flowers in naked or bracteate heads, rarely racemes:—

Flowers in globose or (male) cylindric heads:—

Stamens 1. 2. Artocarpus.

Stamens 4. 3. Cudrania.

Flowers male in cylindric spikes, female in racemes. 4. Balanostreblus.

Male and female heads cymose, or female solitary:—

Stamens free; style short:—

Fruit syncarpous. 5. Conocephalus.
Stamens inflexed in bud:—
  Male and female flowers spicate or female
  subcapitate:—
  Ripe carpels enclosed in the syncarp. 6. Morus.

Male flowers spicate:—
  Ripe carpels pendulous on long fleshy
  stalks:—
  Achenes stipitate. . . . . . . 7. Broussonetia.

Male flowers in fascicled spikes, female in
  globose heads:—
  Achenes sessile. . . . . . . 8. Allæanthus.

Fruit the result of one flower:—
Unarmed:—
  Glabrous. Leaves quite entire:—
  Males in short cymes; female solitary:—
  Sepal accrescent, enclosing the fruit. 9. Pseudostreblus.

Hairy. Leaves irregularly dentate:—
  Male subcapitate; female solitary:—
  Sepals closely imbricating. . . 10. Streblus.

More or less armed:—
  Male flowers spicate; females solitary or
  few on a peduncle, not laticiferous. . . 11. Taxotrophis.

1. FICUS Linn.

Trees or shrubs of very variable habit, often epiphytic,
sometimes creeping or climbing by adventitious roots, with
milky juice. Leaves usually alternate (rarely opposite),
entire, lobed, serrate or toothed; stipules often enclosing the
bud, deciduous, leaving annular scars. Inflorescence is
hollowed out and consists of a number of flowers often mixed
with a few bracteoles inside a pear-shaped or globose common
receptacle which opens by a narrow mouth at the top;
receptacles usually with 3-4 bracteoles at the base, often
lengthening into a stalk and the mouth closed by imbricate
bracts, axillary or on tubercles from the main stem and large
branches or on special leafless shoots arising from the main
stem from near its base. Flowers minute, 1-sexual, monœcious
or rarely dioecious. Male flowers:—perianth 2-6-fid, or
partite; stamens 1 or 2 (rarely 3-6), erect in bud. Pseudo-
hermaphrodite flowers:—perianth as in male with pistil which
does not produce seeds. Female flowers:—perianth as in male
or imperfect; ovules pendulous; style excentric; stigma entire or 2-armed. *Gall flowers* :—perianth as in female flowers; ovary contains the pupa of a hymenopterous insect; style short. *Neuter flowers* :—perianth as in male. *Fruit* an enlarged hollow receptacle, the inner wall of which is crowded with crustaceous or fleshy achenes; embryo curved; albumen scanty; radicle ascending.

Mode of pollination is extraordinary, there being a special insect (*Blastophaga-wasp*), adapted to *Ficus* flowers. The gravid female enters a fig inflorescence and lays eggs in the gall flowers and as the perfect insects emerge they carry the pollen to other receptacles and thus fertilize the female flowers.

Narrow connective bands of parenchyma in the wood. (Brandis).

A. Pseudo-hermaphrodite :

1. Male flowers monandrous with a rudimentary pistil in the same receptacle, with gall flowers and female flowers in separate receptacles. ... 1. Palæomorphe.

B. Unisexual or asexual :

1. Male flowers without rudimentary pistil :

2. Male, gall and fertile female flowers on the same receptacle. ... 2. Urostigma.

3. Male flowers unisexual and gall flowers in one set of receptacles; fertile female flowers only in another set :

(a) Flowers monandrous :

(i) Receptacle mostly axillary. ... 3. Sycidium.

(ii) Receptacle mainly in fascicles from stem or branches. 4. Covellia.

(b) Flowers diandrous :

(i) Receptacle mostly axillary. ... 5. Eusycce.

(ii) Receptacle mostly in fascicles from stem or branches. ... 6. Neomorphe.

Section *Synæcia* is not represented in Assam.


Section 1. Palæomorphe :

Stipules long, ovate-lanceolate, acuminate :—

Leaves inequilateral, lanceolate or elliptic-ovate, acuminate, entire :

Female sepals 4, hyaline. ... 1. *F. gibbosa.*
Stipules minute:
- Leaves broader, ovate or ovate-elliptic, abruptly caudate:
  - Female perianth 3-cleft. .... 2. *F. urophylla*.

Section II. Urostigma:
Leaves coriaceous, pubescent when young, more or less ovate; base more or less cordate:
- Receptacle globose, pubescent:
  - Leaves thickly chartaceous; lateral nerves 4-7 on either half. .... 3. *F. bengalensis*.
- Receptacle oblong or ovoid, tomentose:
  - Leaves coriaceous; lateral nerves 12-20 on either half. .... 4. *F. mysorensis*.

Leaves coriaceous, glabrous at all times, more or less ovate or elliptic; base not cordate:
- Receptacle oblong:
  - Leaves broadly elliptic or ovate-oblong, shortly cuspidate. .... 5. *F. altissima*.
- Leaves coriaceous, narrowly elliptic or oblanceolate, all parts glabrous; base 3-nerved, cuneate; lateral nerves 10-12 on either half. .... 6. *F. obtusifolia*.
- Leaves coriaceous or sub-coriaceous; lateral nerves fine, numerous, nearly at right angle to the midrib, anastomising little except at the margin:
  - Stipule large, sub-persistent:
    - Receptacles, greenish-yellow when ripe. .... 7. *F. elastica*.
  - Stipules small, caducous:
    - Receptacle yellow or red when ripe. .... 8. *F. Benjamina*.

Leaves sub-coriaceous; nerves conspicuous; nervules and reticulation minute but distinct:
- Receptacle <\frac{1}{2} in. across or more:
  - Stipules small:
    - Leaves narrow-elliptic, oblong. .... 9. *F. rhododendrifolia*
- Receptacle less than <\frac{1}{2} in. across:
  - All parts glabrous, receptacle bluish-purple. .... 10. *F. glabella*.
  - Young parts pubescent or glabrous; receptacle yellowish or reddish. .... 11. *F. retusa*.

Leaves coriaceous, elliptic or oblanceolate:
- Receptacle with a distinct slender peduncle with 3-free bracts low down on the peduncle; stipules pubescent. .... 12. *F. nervosa*. 
Leaves sub-coriaceous or membranous, on long slender petioles which are sometimes jointed to the blade:

Leaves cordate, acuminate:
   Acumen short:
      Base truncate. .. .. 13. F. Rumphii.
   Acumen long:
      Base rounded or truncate, rarely cor-
      date. .. .. 14. F. religiosa.

Leaves not cordate, acuminate:
   Receptacle glabrous, sessile:

Leaves almost membranous:
   Male perianth 4-5-partite; petiole 1.5-2 in. long. .. .. 15. F. infectoria.

Leaves sub-coriaceous:
   Receptacle shortly pedunculate:
      Male perianth gamophyllous; petiole 2.5-4 in. long. .. .. 16. F. geniculata.

III. Sycidium:

Erect shrubs or trees:

Leaves entire or nearly so, caudate-acuminate:
   Receptacles clavate or sub-globose, 3 in. across or more. .. .. 17. F. clavata.
   Receptacle in axillary pairs; achene triangular:
      Female perianth similar to male perianth; leaf base 3-nerved. .. 19. F. bhotanica.
   Receptacle in axillary pairs; achene orbicular or ovoid:
      Leaves very inequilateral, base 3-5-nerved. .. .. 20. F. obscura.

Creeping, straggling or scandent shrub:
   Receptacle 5 in. across or more; base rounded, truncate or cordate, 3-5-nerved. 21. F. heterophylla.
   Receptacle about 25 in. across; base cuneate. 3-nerved. .. .. 22. F. rostrata.

IV. Covellia:

Leaves mostly opposite:
   Receptacle axillary, sub-globose:
      Leaves narrow, linear, oblanceolate or cuneate; base-narrowed into the petiole;
      young parts mostly hirsute. .. .. 23. F. samocarpa.
   Receptacle axillary or on tubercle on the same plant:
      Leaves ovate-oblong or elliptic-oblong; base sub-cordate or rounded; all parts hispid. .. .. 24. F. hispida.
Leaves mostly alternate:—
Receptacles shortly hispid and verrucose
when ripe, 4·7 in. across, reddish-brown
(ripe):—
Leaves unequally sub-auriculate; tomen-
tose when young; base cordate. .. 25. F. Cunia.
Receptacles sub-pyriform and verrucose,
5 in. across:—
Leaves glabrous, shining, tapering to
the base. .. .. .. 26. F. prostrata.
Receptacles dimorphic. 6-1 in. across,
depressed, globose, glabrous:—
Leaves granulate beneath. .. .. 27. F. fistulosa.

V. Eusyce:—
Erect shrubs or trees:—
Young parts densely tomentose:—
Leaves not entire (dentate or lobed):—
Receptacle hispid-tomentose. .. 23. F. hirta.
Young parts sparsely hairy:—
Leaves entire or nearly so:—
Receptacle pedunculate lengthening out
into a stalk:—
Gradually constricted. .. .. 29. F. pyrifloris.
Suddenly constricted. .. .. 30. F. erecta.
Receptacle ovoid, sub-sessile. .. 31. F. silhetensis.
Young shoots silky with long hairs; stipule
amplexicaul:—
Receptacle orange-red. .. .. 32. F. lepidosa.
Young parts glabrous:—
Leaves entire:—
All kinds of flowers in the same re-
ceptacle; male flowers 2-3. .. 33. F. nemoralis.

Creeping or epiphytic:—
Leaves ovate, rotund, pubescent or pube-
rous, membranous:—
Receptacle long pedunculate. .. 34. F. laevis.
Leaves broadly ovate, glabrous when
mature, entire, chartaceous. .. 35. F. scandens.
Leaves oblong, length twice the breadth:—
Leaves glabrous or nearly so when adult:—
Receptacle with basal bracteoles soli-
tary, globose or ovoid, hairy, 3·8 in.
across. .. .. .. 36. F. foveolata.
Receptacle solitary or clustered, glabrous,
orange-red when ripe. 2·5 is. across. .. 37. F. ramentacea.
Leaves hairy beneath:—
Receptacles solitary or in pairs, almost
glabrous, globose. 3·4 in. across. .. 38. F. crininervia.
VI. Neomorphe:

Erect trees:

Leaves broadly ovate, serrate or denticulate;
base deeply cordate:

Receptacle tuberculed, 2 in. across. . . 39. F. Roxburghii.

Leaves ovate-elliptic, serrate, sub-coriaceous;
base not cordate:

Receptacle 1 in. across. . . . 40. F. pomifera.

Leaves entire, ovate, ovate-oblong; base acute
or obtuse:

Receptacle pedunculate, 1.25 in. across.
Leaves membranous. . . . 41. F. glomerata.

Leaves entire, lanceolate:

Receptacle turbinate when ripe, depressed,
verrucose, 1-2 in. across in cluster of 5-8. 42. F. lanceolata.

Leaves entire, oblong or narrowed, elliptic,
inequilateral:

Receptacles smooth, in bracteate panicles,
about 1 in. across. . . . 43. F. Clarkei.

I. Ficus gibbosa Bl. Vern. Loti-dicoru, Jaribur, Ass.;
Dieng-soh-la-khain, Khasi; Ratke, Miri & Abor; Jamman,
Kuki; Phrap-rakhet, Garo.

A small or sometimes a large tree, often epiphytic; young
branches scaberulous. Bark darkish-grey, warty; blaze green-
ish. Leaves 2.5-6 by 1.3-2.5 in., usually inequilateral, ovate-
elliptic or elliptic-lanceolate, sometimes gibbous towards the
base, entire, usually more or less acuminate, thinly coria-
ceous, glabrous above, harsh and brownish beneath
(when dry); lateral nerves 3-6 on either half conspicuous,
with intra-marginal veins, never lucid; base 3-nerved, cuneate
or obtuse; petiole 3-6 in. long; stipules convolute. Recep-
tacles yellowish when ripe, 25-3 in. across, pedunculate,
globose or pyriform, minutely hairy and verrucose, rather
scabrid with few basal bracts below the peduncle situated
in the receptacle containing gall flowers. Male flowers;
perianth segments 4-6, linear, fleshy; anther 1 with a short
filament. Fertile female flowers in separate receptacle; perianth
hyaline, with linear hairy segments. Ovary globose, smooth;
style short, lateral. Achene obliquely ovoid, slightly hairy.
N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, NOWGONG, KAMRUP, N. C. HILLS, LUSHAI HILLS, CACHAR, GOALPARA, GARO HILLS and K. & J. HILLS.

Firs. 1-3.

Var. typica—Leaves variable, lobed purplish-brown beneath, nerves and veins pale.

Common throughout the Province.

Var. cuspidifera—Vern Ratke-asing, Miri; Mumugichak, Naga. Leaves elongate, more or less acuminate, minutely tubercled beneath, opaque.

N. E. F. TRACT, SIBSAGAR.

F. subulata Bl.

A large straggling dioecious shrub; young parts minutely pubescent. Leaves 4-10 in., elliptic, elliptic-lanceolate, or oblanceolate, entire, membraneous, hispid; lateral nerves 10-20 on either half; petiole about 3 in. long; stipules 5-1 in., subulate. Male and gall flowers in ovoid receptacles and female in globose receptacles (without male flowers). Perianth gamophyllous, hairy; lobes 4, oblong. Receptacle orange-red, with no basal bracts.

LUSHAI HILLS.

Firs. & Fr. Cold season to hot season.

2. Ficus urophylla Wall.

An erect shrub or small tree (40-50 ft. high), often epiphytic; young parts sub-scabrid. Leaves 2-4 by 1.2-2.4 in., elliptic or ovate, entire, abruptly caudate, entire or undulate, coriaceous, glabrous; lateral nerves 2-4 on either half, more prominent beneath; base narrowed into the petiole which is 2-3 in. long; stipules minute, subulate. Receptacle shortly pedunculate, axillary, subglobose, scabrid, hispid, 2-3 in. across, reddish yellow when ripe; basal bracts absent; peduncles hirsute. Male flowers sepals 4; stamens 1, joined to a pistillode. Female flowers perianth 3-fid; style short, diverging. Achene obliquely ovoid.

KAMRUP, K. & J. HILLS.

Firs. 2-3. Ripe fruit rainy season.
3. **Ficus bengalensis** Linn. The Banyan tree. Vern. Rabung, Kuki; Khong-nang, Manip.; Gonok, Garo; Bor, Ass.; Vata, Sans.

A spreading evergreen tree, epiphytic in early life, sending down aerial roots from the branches which thicken greatly and ultimately become stilts. Bark smooth, greyish; young parts softly pubescent. Leaves 4-8 by 2-5 in., ovate. elliptic, entire, obtuse or rounded, coriaceous, green and glossy above, glabrescent or pubescent beneath; lateral nerves 4-7 on either half, looped within the margin, prominent beneath; base 3-7 nerved (upper pair stout), usually rounded or sub-cordate; petiole 5-2 in. long; stipules 7-1 in. long, deltoid, acute, coriaceous. Male gall and fertile (female) flowers in the same receptacle. Male flowers numerous near the mouth of the receptacle; perianth segments 4; stamen 1. Gall flowers similar, with a short style. Female flowers with smaller perianth and elongated style. Receptacle 5-75 in. across, globose, pubescent, sessile, axillary, supported by 3 rounded coriaceous spreading bracts, scarlet when ripe.

Common as a shade tree.
SYLHET, CACHAR, KAMRUP & GARO HILLS (upto 4,000 ft.).
Wood is used as a well-curb, durable in water. The bark is tonic and diuretic; milky juice is made into bird-lime. Leaves and twigs are fodder for cattle and elephants.

Ripe fruit. 4-7.

4. **Ficus mysorensis** Heyne. Vern. Dhopobar, Ass.; Phrap, Garo; Laidap, Kach.; Rabung-tak, Kuki; Dibuk-changne, Duff.; Dieng-ka-jiri; Rotga-asing, Miri.

A very large tree, epiphytic in early life, 12'-15' in girth; young parts tomentose. Bark greyish, fairly plain, with horizontal wrinkles; inside light brown or darkish cream, mottled and brittle. Leaves 6-10 by 2·5-5·5 in., broadly elliptic or ovate-elliptic, entire, bluntly acuminate, coriaceous, glabrous and dotted (numerous) above, glabrescent beneath; lateral nerves 12-20 on either half, anastomising into an intra-marginal nerve; tertiaries very finely and elegantly reticulate; base 3-8 nerved rounded or shallow cordate; petiole 8·1-5 in. long; stipules broadly triangular, rusty-tomentose. Male
flowers crowded near the apex of the receptacle, pedicellate; perianth segments 4; stamen 1. Female flowers-style lateral, elongated. Receptacle globose, generally in pairs, bright orange when ripe, 1-1.5 in. across, glabrous, rusty-tomentose when young, with three tubercled broad spreading basal bracts. Achenes ovoid.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, DARRANG, NOWGONG, KAMRUP, GOALPARA, CARO HILLS and K. & J. HILLS (upto 3,000 ft.).

Flrs. Cold season. Ripe fruit 4-8.


An enormous spreading tree, with aerial roots (15'-20' in girth). Bark greyish, rough; inside whitish with brown dots. Leaves 4-7 by 2-4 in., broadly elliptic or ovate-elliptic or ovate-lanceolate, rather obtuse, entire, coriaceous, glabrous and dotted above, glabrescent beneath; lateral nerves 5-7 on either half (sometimes more); base usually 3-nerved and rounded; petiole 7-1.8 in. long; stipules about 2 in. long, lanceolate. Male flowers scattered; perianth segments 4; anther subsessile. Fertile female flowers usually sessile; style elongated. Ovary minutely tubercled. Receptacles sessile in axillary pairs, enclosed in deciduous bracteate calyptra, yellowish when ripe, ovoid, 75.1-2 in. across.

N. E. F. TRACT, KAMRUP & GOALPARA.
Decoction of bark with lime gives light red dye (Mangaldai).

Flrs. Cold season. Ripe fruit hot season.

F. glaberrima Bl. Vern. Dieng-tharlät, Khasi; Nah-olai, Kuki; pane-asing, Abor.

A large tree (80'/74'') glabrous, epiphytic in early life, usually buttressed. Bark darkish-grey, with large warts, hard, 3 in. thick; inside brown, with light pinkish streaks. Leaves 5-8 by 1.25-2.25 in., oblong-lanceolate, ovate-lanceolate or elliptic, entire, acuminate, subcoriaceous, glabrous, shining above and dotted beneath; lateral nerves about 10 on either half, impressed above, prominent beneath; basal nerves 3; petiole 1.2 in. long; stipules about 7 in. long, glabrous, fugacious. Male flowers few, sub-sessile; perianth segments 4; stamen 1; filament short. Gall flowers usually sessile; perianth 4-fid.
Fertile female flowers—perianth obsolete. Receptacles axillary, 1 or 2 together, sub-pyriform, tubercled, about \( \cdot 25 \) in. across, orange-coloured when ripe, pedunculate; peduncle \( \cdot 3 \cdot 6 \) in. long; basal bracts 3, deciduous, pubescent. Achenes viscid.

N. E. F. TRACT, CACHAR, K. & J. HILLS (5,000 ft.).
Fr. Cold season.


A large tree, glabrous, often epiphytic. Bark greyish, thin, rough; blaze light-red, exuding sticky milky juice. Leaves 2\( \cdot 5 \cdot 7 \cdot 5 \) by 1\( \cdot 3 \cdot 5 \) in., oblong-elliptic or obovate-elliptic, entire, obtuse or rounded, thickly coriaceous, glabrous, dotted above; lateral nerves 10-12 on either half; base 3-nerved, cuneate or acute; petiole \( \cdot 3 \cdot 7 \) in. long, stout; stipules up to 1 in. long, ovate-lanceolate, acuminate. Male flowers numerous, scattered; perianth segments 3. Gall flowers: perianth segments about 4; style sub-terminal, elongate. Female flowers sessile; style lateral; stigma funnel-shaped. Receptacle sessile, axillary, globose, depressed at the apex, yellowish when ripe and dotted, about \( \cdot 7 \) in. across; basal bracts 3, coriaceous, cordate. Achenes ovate, rotund, viscid.

GOALPARA, GARO HILLS. SIBSAGAR and SYLHET, K. & J. HILLS.
Fr. Cold season.


A gigantic tree, quite glabrous, sending down numerous aerial roots; trunk strongly buttressed, usually epiphytic under natural conditions. Leaves 5-12 by 2-5\( \cdot 5 \) in., elliptic to oblong, entire, bluntly and abruptly caudate, coriaceous, shining; lateral nerves very fine, numerous, almost parallel, close, nearly at right angles to the midrib and running almost to the margins; base rounded or narrowed, obscurely 3-5 nerved; petiole \( \cdot 5 \cdot 2 \cdot 5 \) in. long; stipules lanceolate, flaccid, reddish, almost half as long as the leaves.
Receptacles enclosed in hooded involucres which fall leaving a saucer-shaped base under the fruit, sessile in pairs, smooth, greenish-yellow, ovoid-oblong, ~5 in. long. Male flowers pedicelled, scattered; sepals 4, ovate; anther sessile. Gall flowers-sepals 4; ovary smooth; style sub-terminal, hooked. Female flowers mostly sessile; style long; stigma sub-capitate. Achenes ovoid, tubercled.

GOALPARA, KAMRUP, DARRANG, LAKHIMPUR, GARO HILLS and K. & J. HILLS (upto 3,000 ft.). Indigenous.

Also cultivated extensively since 1874 (Charduar plantation—Darrang, Kulsi plantation—Kamrup) for the yield of India rubber. At present abandoned as the exploitation of India rubber from these trees is not economic.

Flrs. Hot season. Fr. Rainy season.


A large tree, spreading, with drooping branches, epiphytic in early life. Leaves 1·5-4 by 1·5-2 in., ovate-elliptic or elliptic, entire, acuminate, thinly coriaceous, glabrous, shining above; lateral nerves slender, numerous, anastomising into an intramarginal nerve; petiole 1·4-8 in. long; stipules lanceolate, about 1·5 in long. Male flowers few, pedicellate, scattered; perianth segments 2, spathulate; anther almost sessile. Gall flowers-perianth segments 3 or 4, spathulate. Female flowers sessile; perianth segments spathulate; stigma large, sessile. Receptacle axillary, often in pairs, globose or ovoid, about 1·4 in. across. Achene more or less reniform.

Guahati (G. Mann’s No. 16). NOWGONG (U. Kanjilal’s No. 2929), SIBSAGAR and K. & J. HILLS.

Flrs. 10-11. Fr. 4.

Var. comosa Kurz. Ver. Bar-nahori-bor, Ass.; The swamp fig.

A large tree, 4·6 ft. in girth. Leaves 2·8-4 by 1·3-2·5 in., ovate to ovate-elliptic, coriaceous. Receptacle longer, globose, about 1·7 in. across; perianth segments not spathulate.

Plains of ASSAM, KAMRUP (G. Mann).

Flrs. 1. Fr. 4.

A moderate-sized tree, often epiphytic, 5-6' in girth, glabrous except the stipules. *Leaves* 3.5-6 by 1.3-2.5 in., elliptic, oblong, ovate-elliptic, entire, acuminate, thinly coriaceous; lateral nerves 12-14 on either half, slender; base rounded or sub-cuneate; petiole short, 4-8 in. long; stipules about 5 in. long. *Male flowers* few; perianth segments 2, broad and flat; anthers apiculate; filament short. *Gall flowers* sessile; perianth segments 3, lanceolate; style elongate; with small stigma. *Receptacles* axillary, sessile in pairs, globose, red when ripe, 3-6 in. across, with 3 broad persistent basal bracts. *Achene* triangular, minutely tubercular.

**CACHAR & LAKHIMPUR.**

Flrs. 10-11. Fr. 4-5.

10. **Ficus glabella** Blume.

A tree. *Leaves* 3.4-5 by 1.5-2 in., ovate-oblong, shortly acuminate, entire, thinly coriaceous, glabrous; lateral nerves 10-14 on either half; base 3-nerved, sub-acute, obtuse or rounded, joined to the petiole which is 6-9 in. long; stipules about 4 in. long. *Male flowers* sessile, few, near the mouth of the receptacle; perianth segments 2, ovate, hyaline; anthers sub-sessile. *Gall and female flowers* similar; perianth leaves 4, hyaline; style long; stigma obovate. *Receptacles* in pairs or rather crowded, axillary, spheroidal, purplish dark when ripe, 2-3 in. across, with minute basal bracts. *Achene* smooth, ovoid or spheroidal.

**SIBSAGAR.**

Fr. 2.


**GARO HILLS & KHASI HILLS** (upti 3,000 ft.).

Flrs. Cold season. Fr. End of hot season.

A large evergreen umbrageous tree, often epiphytic, forming a tangled mass with aerial roots and horizontal branches, glabrous. *Bark* greyish, covered with lenticel bars, bright green underneath the corky layer; light-brown inside, mottled with red veins. *Leaves* 1·5-3·5 by 8-2·3 in., ovate, rotund or ovate-elliptic or rhomboid, entire, acute or short-acuminate, entire, coriaceous, glabrous; lateral nerves 8-10 on either half, slender; base 3-nerved, narrowed into the petiole which is 2·5 in. long; stipules about 5 in. long, lanceolate. *Male flowers* numerous; perianth segments 3, ob lanceolate. *Gall flowers*-perianth segments 3, spathulate; stamen 1. *Female flowers*-perianth minute; ovary smooth; style short; stigma clavate or cylindric. *Receptacle* 2·3 in. across, sessile in pairs, axillary, sub-globose, yellowish when ripe, with 3 broad ovate persistent basal bracts. *Achene* ovoid or obovoid.

Common in swamps.
LAKHIMPUR, NOWGONG, KAMRUP, GOALPARA. GARO HILLS & CACHAR.

Flrs. Cold season. Fr. Hot season.

**Var. nitida.** *Leaves* ovate or rhomboid; apex bluntly acute or obtuse; narrowed at the base; all the flowers are often pedicellate.

SYLHET, KAMRUP, CACHAR (G. Mann).


A very large tree with a broad crown, often buttressed. *Bark* plain, greyish, whitish or brownish, pale yellow; rather granular inside with white striations. *Leaves* 3-10 by 8-4 in., variable, slightly inequilateral, elliptic, oblong-lanceolate or elliptic-oblong, entire, shortly acuminate, thinly coriaceous, shining and glabrous above, dotted beneath and brownish (when dry); lateral nerves 9-12 on either half, anastomising into an intra-marginal nerve; base narrowed into the petiole or rounded, slightly unequal; petiole 4·6 in. long; stipules pubescent, about 5 in. long. *Male flowers* pedicellate, near the mouth of the receptacle; perianth seg-
ments 3, elongate, acuminate; ovary ovoid; style short. Female flowers sessile, rarely pedicellate; perianth segments 3, lanceolate; stigma clavate; style twice as long as the achene. Receptacle axillary, pedunculate, 3-8 in. across, without basal bracts and with 3 small bracts low down on the peduncle, slightly verrucose, sub-globose, puberulous, yellowish or reddish yellow. Achene ovoid, acuminate.

SIBSAGAR, NOWGONG, KAMRUP, GOALPARA, GARO HILLS, CACHAR and K. & J. HILLS.

Frs. 10-12. Fr. Hot season.


A large deciduous tree, often epiphytic. Bark greyish, smooth, exfoliating in hard scurfy flakes in old trees; inside light reddish-white with irregular streaks of white and faint purple. Leaves 3-6 by 1.5-3 in., broad ovate or ovate-oblong, entire, acuminate, sub-coriaceous, quite glabrous, upper surface dotted and shining; lateral nerves 3-6 on either half; base usually 3-5 nerved, rounded, truncate or narrowed into the petiole; petiole 1.5-3 in. long, jointed with blade; stipules 1.5-1 in. long, ovate-lanceolate. Male flowers few near the mouth of the receptacle; perianth segments spatulate; stamen 1. Female and Gall flowers-perianth segments 3, lanceolate; ovary ovoid, smooth; style elongate; stigma clavate. Receptacle sessile, in axillary pairs, globose, 3-5 in. across, black when ripe, with 3 orbicular basal bracts. Achene minutely tubercled, mucilaginous.

SYLHET, CACHAR, GARO HILLS, KAMRUP and NOWGONG. Lac insects are reared on it. Leaves and twigs are cattle and elephant fodder.

Ripe fruit 5-6.


A large deciduous tree, usually epiphytic; trunk irregularly shaped. Bark greyish with brownish specks. Leaves
4·5-7 by 3-5 in., orbicular, ovate, entire or undulate, caudate-acuminate (acumen 1·3 in. long) coriaceous, glabrous, shining above, tubercled beneath; lateral nerves 6-8 on either half; veins prominent, closely reticulate; base 5-7 nerved. shallow cordate, rounded or truncate, sometimes narrowed into the jointed petiole; petiole 3-4 in. long, slender, terete; stipules minute, ovate-acute. Male flowers sessile, very few, often absent; perianth segments 3, ovate; stamen 1; filament short. Female and Gall flowers-perianth segments 5, lanceolate; style short, lateral; stigma round. Receptacle sessile, in axillary pairs, ·5 in. across, sub-globose, somewhat depressed, dark purple when ripe, with 3 pubescent coriaceous broad basal bracts.

Wild, common, generally planted near temples and wells. It is held in veneration by Hindus. Good for charcoal and packing cases. An epiphyte, destructive to forest trees. The leaves and twigs are good for elephant fodder.

Flrs. 2-4. Ripe fruit 4-6.


A middle-sized or large deciduous tree with spreading crown, epiphytic in early life, sometimes sending down a few aerial roots. Bark greyish, ·3 in. thick; blaze red, with yellow vertical lines, fibrous, turning brown. Wood light-yellowish or cream coloured. Leaves 3-8 by 1·5-3·5 in., oblong-elliptic, oblong-ovate or ovate, abruptly and shortly acuminate, entire, often undulate, rather membranous, glabrous, shining above; lateral nerves 6-9 on either half, looping within the margin; base 3-nerved, cuneate, rounded or sub-cordate; petiole up to 3·5 in. long; stipules about ·5 in. long, pubescent outside, broadly ovate. Male flowers stamen 1; anther broad-ovate; filaments short. Female and Gall flowers-tepal 3 or 4; stigma elongate; style short. Receptacle in axillary pairs, usually sessile, sub-globose, ·25·35 in. across, occasionally larger,
tubercled, white when ripe or flushed with red and dotted; basal bracts 3, ovate or orbicular, free.

SIBSAGAR, KAMRUP and K. & J. HILLS (5,000 ft.).
Flrs. Cold season. Ripe fruit 5-6.


A large tree, glabrous, stipulately pubescent; twigs lenticellate. *Bark* brownish-grey, reticulately fissured vertically; inside light-brown, very finely fibrous. *Leaves* 3·5-8 by 1·8-4 in., ovate, ovate oblong or oval, entire, margin slightly recurved, acuminate, rigidly coriaceous, glabrous; lateral nerves 6-12 on either half, prominent beneath, very closely elegantly and prominently reticulate between the main lateral nerves; base 3-5 nerved, rounded, obtuse or narrowed into the petiole; petiole 1·5-4 in., long, slightly channelled; stipules about 5 in. long, pubescent, ovate-lanceolate. **Male flowers**-perianth gamophyllous; mouth oblique or split; segments 3; stamen occasionally 2; filament short. **Gall and Female flowers** gamophyllous, deeply 3 or 4-fid; style elongate; stigma deeply lobed. **Receptacles** axillary, solitary or paired or in pendulous clusters on raised tubercles on the stem, 25-3 in. across, sub-globose, depressed, verrucose, yellow when ripe; basal bracts 3, broad, mostly lobed, pubescent. **Achene** obovoid.

**GARO HILLS, K. & J. HILLS, NOWGONG, N. C. HILLS & SYLHET.**
Leaf scales acid, eaten cooked.
Flrs. 9-11. Fr. Hot season.


An erect shrub; young parts scabrid. *Bark* greyish-brown, warty; blaze white, with yellow streaks; exuding milky juice. *Leaves* 3·5-8 by 6·1-5 in., alternate, oblong-lanceolate or oblanceolate, abruptly acuminate or caudate, upper half coarsely toothed, lower half entire, rather thinly coriaceous, glabrous but harsh; lateral nerves 4-8 on either half; base obscurely 5-nerved, acute or cuneate; petiole 2·3 in.
long; stipules caducous, 3 in. long, lanceolate. Male and Gall flowers intermixed in the same receptacle, pedicellate; perianth of both gamophyllous; male monandrous. Female flowers on different smaller receptacles; perianth gamophyllous, campanulate, 5-toothed; style sub-terminal, elongate; stigma cylindric or obovoid. Receptacle axillary, solitary, globose, more or less scabrid, yellow when ripe 3 in. (globose) to 75 in. (obovoid) across; basal bracts very small; peduncles 1-3 in. long. Achene ovoid, slightly papillose.

K. & J. HILLS (upto 5,000 ft.).

Flrs. 9-10. Ripe fruit 5-6.


A small tree, sometimes epiphytic, occasionally scandent with spreading branches (U. Kanjilal); young parts puberulous. Bark grey, 12 in. thick; blaze brownish; wood white or cream coloured. Leaves 2-5 by 8-1.5 in., lanceolate or oblanceolate, bluntly and shortly acuminate, entire, membranous, almost glabrous, pellucidly punctate; lateral nerves 4-6 on either half; base 3-nerved, acute or narrowed into the petiole; petiole thick, 1-3 in. long; stipules as long as the petiole, subulate, convolute, curved. Male flowers—tepals 3, hyaline; monandrous; anthers ovoid. Gall flowers-style tubular, latreal. Female flowers in different receptacle from the males and in different plants; perianth gamophyllous, 3-toothed; style short; stigma cylindric. Receptacle almost sessile, solitary or clustered, globose, reddish when ripe, 16 in. across; basal bracts 0 but with a few minute bracts on the middle of peduncles or lower down. Achene with a hyaline border all round it.

LAKHIMPUR, DARRANG, SIBSAGAR, GARO HILLS & KHASI HILLS (upto 4,000 ft.).

Flrs. 3-4. Ripe fruit 10.

19. Ficus bhotanica King.

An erect shrub; young parts pubescent. Leaves 3.5-4.5 by 1.5 in., oblong, ovate-oblong, more or less acuminate,
irregularly toothed, lobed or deeply lyrate, membranous, scabrid above, glabrescent or sparsely pubescent beneath; lateral nerves 5-7 on either half, with elegant reticulation beneath; base rounded or sub-truncate, 3-nerved; petiole 5-7 in. long; stipules about 5 in. long, ovate-lanceolate, pubescent. Male flowers pedicellate; tepals 5; stamen 1 or 2; anthers broadly ovate. Gall flowers—perianth similar to male, large; ovary smooth; style short, sub-terminal. Female flowers—perianth similar to male but half as long; style lateral, shorter than the ovary. Receptacles axillary, 5 in. across, smooth when ripe; umbilicus with long bracts; basal bracts 3, scarious, ovate, acute. Achene triangular, smooth.

GOALPARA, LAKHIMPUR—(Master) & DARRANG (G. Mann).

Flrs. Hot season. Fr. 7-9.

20. Ficus obscura Blume.

A small tree (28'/30'') with spreading crown. Bark dark-brown with horizontal wrinkles; inside white-mottled with yellowish-brown strand; juice more or less watery. Leaves 7-11 by 3-5 in., bifarious, oblong, elliptic-ovobovate, elliptic, often inequilateral, acuminate, dentate-serrate, membranous, harshly hispid; pubescent beneath; lateral nerves 4-6 on either half; base oblique, 3-5-nerved; petiole 3-8 in. long; stipules hirsute, deciduous, longer than petioles. Male flowers—tepals 4 with 1 stamen or tepals 6 with 2 stamens. Gall flowers—tepals 4, lanceolate; ovary smooth, sub-globose; style lateral, short; stigma dilated. Female flowers—tepals 5, lanceolate (narrow) hispid inside, hyaline; style long, lateral; stigma cylindric. Receptacles axillary, in pairs, sometimes solitary or in clusters, rarely in fascicles from the stem below the leaves, globose or ovoid, reddish when ripe, 35-75 in. across, minutely hispid; bracteoles present low down the peduncles; umbilical bracts prominent but no basal bracts. Achene orbicular-ovoid.

N. E. F. TRACT, K. & J. HILLS & GARO HILLS (upto 4,000 ft.).

Flrs. Cold season. Ripe fruit—hot season.

A variable shrub, often trailing and scandent; branches brown hispid or pubescent. *Leaves* 1-4 by ·5-1 in., very variable, narrow-lanceolate to broad-ovate, acuminate, lobed, irregularly dentate or repand, membranous, scabrid or hispid; lateral nerves 5-7 on either half; base rounded or cordate, 3-5 nerved; petiole ·5-2 in. long; stipules about ·5 in. long, glabrous, linear. *Male flowers*-perianth gamoplyllous, 3-4-fid; monandrous. *Gall flowers*-perianth similar; ovary smooth; style short, lateral. *Female flowers*-perianth gamoplyllous, 4-cleft. *Receptacle* axillary, solitary, pyriform or globose, hispid when young, organge-yellowish and smooth when ripe, ·5-1 in. long, about ·5 in. across. *Achene* sub-globose, minutely tubercled (external coat hyaline), viscid.

Common on the plains on river banks of most of the localities.

Flrs. Cold season. Ripe fruit. Hot season.


*Leaves* shortly petiolate, narrow, not lobed. *Receptacle* shortly pedunculate, globose or sub-pyriform.

K. & J. HILLS.


*Leaves* long petiolate, broad. *Receptacles* long pedunculate, more or less pyriform.

N. E. F. TRACT, DARRANG & NOWGONG.


A scandent or creeping shrub, very rarely erect; young part harsh. *Bark* smooth, greyish brown; blaze yellowish-white, exuding watery gum. *Leaves* 2·5-7·5 by 1-3 in., alternate, narrowly oblong, elliptic or lanceolate, abruptly caudate-acuminate, entire or sub-sinuately toothed, membranous or sub-coriaceous, glabrous and shining above, paler and harshly scabrid beneath; lateral nerves 4-6 on either half; stout and conspicuous; base 3-nerved, narrowed into the petiole or acute; petiole ·2-·5 in. long; stipules subulate, minute. *Male flowers*-tepals 3; anthers elongate as long as
the filament. *Gall flowers*-tepals 3, short; ovary smooth, globose; style lateral, short. *Female flowers* gamophyllous; perianth 2-3-partite; style lateral; stigma cylindric. *Receptacles* axillary, solitary, in pairs or fascicles, subsessile or shortly pedunculate, speckled and scabrid, with basal bracts imbricate when young, brick red when ripe, ·2-·3 in. across, globose. *Achene* ovoid, elongate on one side.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, NOWGONG, GARO HILLS & KHASI HILLS.

Frs. Cold season. Ripe fruit 4.


A low spreading gregarious shrub; young shoots rusty-hirsute. *Leaves* 1-5 by ·3-1·2 in., opposite, usually crowded at the ends of branchlets, oblanceolate or narrow-lanceolate, acuminate, entire or serrate along the upper half, membranous when young, thinly coriaceous when mature, glabrous above, slightly scabrid beneath, with the midrib and nerves strigose; lateral nerves 6-8 on either half; base 3-nerved, acute or narrowed into the petiole; petiole ·5-1 in. long; stipules scarious, persistent, glabrous, ovate, acuminate, about ·5 in. long. *Male flowers*-tepal 3-4; monandrous. *Gall flowers*-perianth hyaline; ovary smooth; style lateral, short; stigma tubular. *Female flowers* style hairy, long, slender. *Receptacles* pedunculate, solitary, usually axillary or in cluster on old stem, pyriform. globose, verrucose, hispid, with scattered bracts on the outside, 8-10 ribbed, brownish when ripe, ·75-1 in. across; basal bracts 3, deciduous; umbilicus prominent. *Achene* hairy, rhomboid.

GOALPARA, GARO HILLS, N. C. HILLS & KHASI HILLS.

Common in avenues of rock along ruins or in rocky beds of hill streams.

Fr. 3.

Bothot, Tipp.; Dengura, Sylh.; Khandao, Kach.; Takpi-asing, Miri; Engthum, Mik.; Asi-haibong, Manip.

A small tree or shrub with hollow branchlets (internodes). *Bark* thin greenish-grey or brownish, often warty, otherwise smooth, often with horizontal wrinkles. *Leaves* 4-12 by 2-2.4 in., usually opposite, obovate, obovate-oblong, elliptic or oblong, acute or shortly acuminate, serrate or somewhat dentate, rarely entire, subcoriaceous, hairy and scabrid above, hispid, pubescent beneath; lateral nerves including basal nerves 6-10 on either half, ascending; reticulation fine; base obtuse, rounded or subcordate, rarely cuneate; petiole hispid, ½-5.2 in. long; stipules ovate-lanceolate, about ½-5 in. long, pubescent externally, numerous in one set of receptacles containing gall flowers. *Male flowers*-tepals 3, broad, concave, hyaline; stamen 1; anther broad; filament short. *Gall flowers* pedicellate; perianth rudimentary or obsolete; style short; stigma dilated. *Female flowers*-perianth similar to gall flowers; style long, lateral, hairy; stigma tubular. *Receptacles* in pairs or clusters on short tubercles from old wood or on long branches, less frequently in pairs on leaf axils, ½-5-1 in. across, obovoid or turbinate, narrowed to a short stalk, slightly umbonate at the top, hispid, occasionally with brown bracts scattered along the sides, greenish-yellow and faintly ribbed when ripe. *Achene* ovoid, umbilicus rather arge; basal bracts 3.

Common throughout the province.
Bark leaves and twigs are good elephant fodder. Green fruits are used as vegetable cooked; good for liver.

Flrs. & Fr. Practically throughout the year.


A middle-sized or small tree; young shoots hairy. *Bark* darkish-grey, somewhat rough; blaze reddish, fibrous; with cream coloured latex. *Leaves* 4-10 in. long, variable, alternate, oblong or elliptic-lanceolate, acute or acuminate, remotely serrate, crenate or sub-entire, thinly coriaceous,
glossy green above, scabrid on both surfaces or pubescent beneath; lateral nerves 7-14 on either half; base very unequal, semisagittate or sub-cordate, with a large 3-4-nerved lobe on one side; petiole 2·6 in. long, scabrid; stipules 7·1·5 in. long, lanceolate. Male flowers—tepals 3; stamen 1; anther ovate; filament short. Gall flowers mostly pedicellate, gamophyllous, 4-fid nearly to the base; ovary globose; style short, lateral. Female flowers pedicellate; perianth similar to gall flowers; lobes narrower; ovary ovoid, emarginate, minutely tubercled, viscid; style lateral, long; stigma large, bifid. Male and Gall flowers in one set of receptacles; female flowers in shortly pedunculate set. Receptacles in pairs or clusters, in axils of scales on drooping mostly leafless branches often very long from near the base of the tree or from larger branches, 4·7 in. across, globose or pyriform, with a central aperture between the apical bracts, more or less verrucose, often with irregular bracteoles on the surface, hispid, reddish-brown or white when ripe. Achene mucilaginous.

Common throughout the province (upto 4,000 ft.).

Leaves are used for fodder. Fruits are edible. Lac is sometimes cultivated on its branches (Singbhum, Behar).

Flrs. & Fr. almost throughout the year.


A small deciduous tree (25'/22") glabrous. Bark greyish-brown, with vertical lines of small warts, otherwise smooth; inside faint pinkish-brown with white blotches inwards from the outer edge of the blaze. Leaves 3-8 by 1·2-2·5 in., alternate, lanceolate or oblong-lanceolate, acuminate, entire, membranous, shining and glabrous but pubescent along the nerves beneath; lateral nerves 12-14 on either half, slender but raised and prominent beneath; reticulations minute with minute translucent dots in their meshes; base slightly unequal, broadly cuneate; petiole 4·8 in. long; stipules lanceolate or subulate, 6·75 by 16·2 in., supporting the receptacles. Female flowers—sepal 3-4, linear; stigma cylindric. Receptacles solitary or in pairs, sub-pyriform,
dark brown, warty red at the apex, with 3 basal bracts and about 6 more bracts on the body besides the apical one, all borne on long branches which spring from the trunk mostly at the base of the tree and then prostrate along the ground, 5 in. across. *Achene* minutely tubercled.

GARO HILLS, KHASI HILLS, SYLHET & CACHAR, (upto 4,400 ft.).

Flrs. 1. Ripe fruits 8.


A shrub or small tree with spreading crown; young shoots beset with a few adpressed hairs. *Bark* greyish-brown, smooth; inside light-brown and mottled. *Leaves* 3·5-9 by 1·5-3·2 in., alternate or opposite, oblanceolate, obovate-elliptic or elliptic, often inequilateral, shortly acuminate, usually entire, subcoriaceous, glabrous, minutely dotted beneath; lateral nerves 5-10 on either half, purplish and prominent beneath, so are the reticulations; base 3-nerved, rounded or obtuse, often unequal; petiole 5·1-5 in. long; stipules 5-75 in. long, scarious, ovate-lanceolate. *Male flowers* few; tepals 2-3, concave, imbricate; stamen 1; filaments long, thick. *Gall flowers* -perianth almost obsolete or very short, hyaline and gamophyllous; ovary ovoid; style short, sub-terminal; stigma funnel-shaped. *Female flowers*-perianth similar to gall flowers; style lateral; stigma cylindrical. *Receptacles* dimorphous, axillary and short peduncled, in some undivided, in others in dense bunches on stem and branches and long peduncles containing only fertile female flowers, sub-pyrriform, glossy green when young, depressed globose, glabrous with pale green speckles, 1·5-1 in. across; basal bracts 3. *Achene* obliquely ovoid, minutely tubercled.

LAKHIMPUR, SIBSAGAR, CACHAR and K. & J. HILLS.

Flrs. 2-3.

Garo; Dieng-soh-lapong, Synt.; Khongal-dimoru, Kamrup; Nabuk, Kuki.

A small tree or shrub; branchlets hollow; young parts tawny or rusty-pubescent or tomentose. Bark warty with horizontal wrinkles; inside light brownish-white, mottled deeper brown. Leaves 5-12 by 4-8 in., variable, broad-ovate. sub-orbicular or ovate-elliptic, acuminate, serrate, 3-5-lobed or entire, scabrid above, densely hirsute, pubescent or tomentose beneath specially on the nerves; lateral nerves 4-7 on either half; base rounded or cordate, 3-7-nerved; petiole 1-7 in. long, hirsute; stipules 5-7 in. long, ovate-lanceolate, acuminate. Male flowers-tepals 4; stamens 2, occasionally 3, sometimes 1. Gall flowers-tepals 4, globose or ovoid, smooth: style lateral, short; stigma funnel-shaped. Female flowers-tepals 4, linear-lanceolate; style filiform; stigma cylindric. Receptacle axillary, in pairs, globose or ovoid, 3-1 in. across, covered with long rufescent hairs; basal bracts pubescent. Achene minutely tuberculate, ellipsoid.

N. C. HILLS, K. & J. HILLS, LAKHIMPUR, SYLHET, CACHAR, GARO HILLS & KAMRUP, (upto 5,000 ft.).

Tender leaves are used as vegetable; ripe fruit eaten.

Flrs. 11. Ripe fruit hot season.

Var. Roxburghii Miq. Receptacle large 3-5 in. across. Leaves ovate, rotund, often deeply lobed.

KHASI HILLS.


A shrub or a small tree (up to 20' high); branches conspicuously marked with scars of fallen leaves; young parts pubescent. Bark greyish, smooth; blaze whitish. Leaves 1-5-4.5 by 3-7 in., narrow-lanceolate or oblanceolate. acuminate, entire, recurved, sub-coriaceous, glabrous with scattered dots above and sparsely pubescent on the nerves beneath; lateral nerves 6-12 on either half, slender: reticulation elongate and conspicuous beneath; base 3-nerved, narrowed into the petiole or obtuse; petiole reddish-brown,
3-6 in. long; stipules subulate, glabrous, 2-4 in. long. Male flowers—tepals 3; stamens 2; anthers ovate. Gall flowers pedicellate; tepals 4; ovary globose, smooth; style short, lateral; stigma tubular, dilated. Female flowers on separate receptacle, tepals 5; style long, sub-terminal, slender. Receptacle pedunculate, axillary, solitary, pyriform, constricted at the base into a stipe, reddish-brown, spongy when ripe, 4-7 in. across; bracts 3 at the junction of the stalk; peduncle 5-1.25 in. long. Achene reniform, minutely tubercled.

K. & J. Hills, N. C. Hills, Cachar, Sylhet & Lakhimpur (upto 4,000 ft.).

Flrs. Cold season. Fr. End of hot season.


Var. ichnopoda. Leaves glabrous. Receptacle glabrous; peduncle elongated.


30. Ficus erecta Thunb.

A shrub or a small tree. Leaves 3-8 in. long, ovate-obovate or ovate-elliptic, entire or obscurely serrate, acuminate, glabrous or scabrid above, hispid and minutely tuberculate beneath; lateral nerves about 8 on either half; base 3-nerved, truncate, rounded, sub-cordate, sometimes slightly unequal; petiole 5-2 in. long; stipules 3 in. long. Male flowers shortly pedicelled or sub-sessile; perianth of 3 pieces, lanceolate; stamens 1-3. Gall flowers—perianth as in male; ovary globose; style lateral; stigma dilated. Female flowers—perianth of 4 pieces, sub-sessile; style lateral; stigma bilobed. Receptacles pedunculate, in axillary pairs, depressed globose, about 5 in. across when ripe; base often much constricted into a stipe to the peduncle, which is upto 1 in. long; basal bracts 3, ovate, triangular.

Khasi Hills (Gustav Mann.).

Flrs. 9-10.

A shrub, sometimes a small tree, rarely straggling; young parts pubescent. Bark ashy-grey, smooth; blaze greenish white. Leaves 2-5·5 by 6-2·5 in., obovate-lanceolate or elliptic, entire, minutely undulate, acuminate, membranous, glabrous; lateral nerves 4-8 on either half, slender, stout; reticulation fine; base rounded, 3-nerved; petiole 3·1-2 in. long, hairy; stipules about 5 in. long, glabrous, lanceolate. Male flowers pedicellate; tepals 3; stamens 2; anthers elongate. Gall flowers-tepal 3; ovary smooth; style short, lateral. Female flowers almost sessile, tepals 3; style long, lateral, curved. Receptacle axillary, solitary or in pairs, globose and reddish when ripe, about 3 in. across; basal bracts 2, minute. Achene obovoid, flattened, papillose, purplish, variegated.

SYLHET, CACHAR, GOALPARA and K. & J. HILLS (upto 4,000 ft.).

Flrs. 9-10. Ripe fruit. Hot season.


A small or middle sized tree (40'/32''); young parts pubescent. Bark brownish-grey, faintly reticulately fissured, 25 in. thick; inside yellowish-brown, granular, mottled with darker brown especially along the edges of the blaze. Wood yellowish. Leaves 3-10 by 1·5-4·5 in., ovate, ovate-elliptic or lanceolate, acute or acuminate, entire, membranous, almost glabrous above, pale grey and sparsely pubescent beneath along the nerves; lateral nerves 8-12 on either half; reticulation fine, distinct; base 3-nerved, usually rounded; petiole 5-2 in. long; stipules lanceolate, about 5 in. long. Male flowers-tepal 4; stamen 1; filament adnate. Gall flowers ovary smooth, globose; style lateral; stigma tubular. Female flowers-tepal 4-5; style sub-terminal; stigma cylindric. Receptacles axillary, solitary or in pairs, peduncled, ellipsoidal, globose or sub-pyriform, orange-red when ripe, about
5 in. across; basal bracts 3, spreading; peduncle 2-5 in. long, pubescent. Achene oblong, oblique, rugose.

SIBSAGAR, LAKHIMPUR, K. & J. HILLS, GARO HILLS, GOALPARA & CACHAR.

Ripe fruit 4.

Var. martabanica. Leaves elongate, lanceolate, acuminate, (ASSAM, King).


A small handsome tree. Bark thin, greyish-brown, fairly smooth, glabrous. Leaves 2-6 by 6-2.5 in., slightly inequlateal, lanceolate, ovate-lanceolate or elliptic, sharply acuminate, entire, membranous, glabrous; lateral nerves 7-12 (rarely more) on either half; reticulation distinct and dark coloured beneath; base 3-nerved, usually cuneate or narrowed into the petiole; petiole 5-1.5 in. long, slender; stipules 3-6 in. long, convolute, glabrous. All flowers in the same receptacle. Male flowers pedicellate, numerous near the mouth of the receptacle; stamens 2-3. Female and Gall flowers-tepals 3, ovate-lanceolate; ovary ovoid (gall); ovary triangular-obovoid and style more lateral and longer than the gall flowers (female). Receptacle axillary, solitary or in pairs, 2.3 in. across, glabrous, sub-globose, reddish when ripe, supported by 3 connate persistent broad basal bracts; umbilicus prominent. Achene minutely wrinkled, rotted.

LAKHIMPUR, SIBSAGAR and K. & J. HILLS (upto 5,000 ft.). Fruit edible. The leaves are lopped for cattle fodder.

Ripe fruit cold season.


34. **Ficus laevis** Bl.

An epiphytic climber, rarely shrubby. *Bark* greyish; blaze greenish. *Leaves* 4-10 by 3-8 in., rotund, broadly ovate or elliptic, cuspidate, obscurely dentate or entire, membranous; lateral nerves 9-11 (including basal) on either half, puberulous or pubescent above, glabrous beneath; base 5-7 nerved, rounded to cordate, rarely sub-cuneate; petiole ·8-3 in. long, rarely abnormally long (7·5") ; stipules ·3-·5 in. long, ovate-lanceolate. *Male flowers* near the apex with galls; tepals 5, linear-lanceolate; stamens 2-3, elongate. *Gall flowers* style short, terminal or sub-terminal; stigma dilated. *Female flowers* pedicellate; style terminal; stigma bifid. *Receptacle* pedunculate, solitary, axillary, globose or sub-pyrfiform, ·5-1 in. across, greenish-yellow when ripe; umbilicus broad; basal bracts 3, small; peduncles ·6-1 in. long. *Achene* globose or elongated.

LAKHIMPUR, K. & J. HILLS & CACHAR (upto 5,000 ft.).

Flrs. Cold season. Fr. Hot season.

**Var. assamica.** Shrubby. *Leaves* very broad, puberulous, rather coriaceous. *Receptacles* in pairs; peduncles about 1·5 in. long, stout.

CACHAR, KHASI HILLS, DUFFLA HILLS, LAKHIMPUR.


A scandent shrub, often rooting at the nodes, sometimes climbing. *Bark* thick, darkish, rough; blaze white with red streaks. *Leaves* 2-3·5 by 1·2-2·2 in., alternate, ovate or elliptic, acute, entire, coriaceous, scabrid above, pubescent beneath; lateral nerves 4-6 on either half, prominent beneath; reticulations very fine; base rounded, 3-nerved; petiole ·3-·5 in. long; stipules ·25 in. long, ovate, acuminate. *Male flowers* sessile near the apex with gall flowers; tepal 4, broad; stamens 2; anthers broadly ovate. *Gall flowers* pedicellate; tepals 4, lanceolate; style short, thick, sub-terminal; stigma hooked. *Female flowers* in separate receptacle; tepals 4, linear; style elongate; stigma subcapitate. *Receptacle* pedunculate, solitary or in pairs, axillary, globose, ·35 in. across, rough, often hairy outside, greenish-yellow when
ripe; peduncle 3.6 in. long; basal bracts 3, ovate, persistent. *Achene* oblong, smooth.

Common throughout the province (upto 4,000 ft.).


An evergreen scandent epiphytic shrub, rooting at the nodes, often climbing; young parts pubescent. *Leaves* 3-6 by 1-2 in., alternate, ovate-elliptic, oblong or lanceolate, acuminate, entire, membranous or thinly coriaceous, glabrous above, glabrescent or pubescent beneath; lateral nerves 5-8 on either half, prominent beneath; base rounded, sub-cordate or cuneate, 3-nerved; petiole 5.8 in. long, hairy; stipules 5 in. long, hairy outside. *Male flowers* pedicellate; tepals 4; stamens 2. *Gall flowers* pedicellate; tepals 4; ovary smooth; style short; stigma dilated. *Female flowers*-tepals 4; style elongate, sub-terminal. *Receptacles* axillary, solitary, globose or ovoid, more or less umbonate, purplish when ripe, when globose about .5 in. across, when ovoid about .8 in. across; basal bracts 3, membranous, reflexed. *Achene* more or less reniform, minutely papillose.

K. & J. HILLS (upto 4,500 ft.).
Flrs. & Fr. Cold season.

**Ficus foveolata** Wall. Var. *oleiformis* King.

A creeping shrub. *Leaves* 1.5-2 by 4.5 in., oblong-lanceolate, caudate-acuminate; base rounded; petiole 3.5 in. long. *Receptacle* ovoid, about 1 in. long, upto .8 in. across, pale-yellowish.
KHASI HILLS.
Fr. 11.

**37. Ficus ramentacea** Roxb.

A powerful epiphytic climber, at times a tree (60 ft. tall). *Leaves* 3-8 by 2.5-3.8 in., elliptic or ovate, entire, acute or sub-acuminate, coriaceous, glossy, bright green, almost glabrous except on the nerves beneath; lateral nerves 5-8 on either half, prominent beneath, lower pairs basal;
base rounded, sometimes cordate; petiole \( \cdot 6-1.5 \) in. long. Male flowers—sepals 2-3; filaments short; anthers 2, elongate. Female flowers—perianth united below; segments 3; style elongate, lateral; stigma cylindric. Receptacle axillary, solitary or clustered, sessile or short-peduncle, sub-globose, \( \cdot 25-\cdot 5 \) in. across, narrowed at base, glabrous. Achene ellipsoid.

LAKHIMPUR, DARRANG, CACHAR, SYLHET and K. & J. HILLS.

Flrs. Cold season. Fr. 4-5.

38. Ficus crininervia Miq.

A scandent shrub; stem and branches rooting; young parts densely silky with long twany-deciduous hairs. Leaves 5-10 in. long, ovate-oblong or ovate-elliptic, entire, slightly revolute, acuminate or shortly cuspidate, coriaceous, glabrous but covered with minute deciduous scales above, covered with silky hairs on the midrib and nerves beneath; lateral nerves 5-6 on either half; reticulation fine; base 5-7 nerved, cordate or sub-sagittate; petioles \( \cdot 5-1.25 \) in. long, hirsute; stipules flaccid, linear-lanceolate, \( \cdot 6-1.4 \) in. long. Male and Gall flowers unknown. Female flowers perianth of 4 peices enveloping the pistil except the stigma; style short, sub-terminal; stigma large, lanceolate. Receptacle \( \cdot 3-\cdot 5 \) in. across, solitary or in pairs, shortly pedunculate, obovoid or globose, constricted towards the base; basal bracts absent; apex slightly umbonate. Young achene obliquely ovoid.


A middle-sized tree with a spreading crown; young parts pubescent; young twigs hollow. Bark greyish, rough, warty; blaze reddish with white vertical lines. Leaves 5-14 by 4-11 in., broad, ovate-orbicular, ovate or rounded, acute or mucronate, entire or toothed, sub-coriaceous, glabrous or glabrescent above, softly pubescent beneath; lateral nerves 3-5 on
either half, joined by transverse veins; base 5-7 nerved, usually deeply cordate; petiole 1-6 in. long, rarely more; stipules 0.5-1 in. long, ovate-lanceolate, pubescent. Male flowers tepals 3, broad, hyaline imbricate; stamens 2-3. Gall flowers pedicellate; perianth 2-3-cleft nearly to the base; ovary ovoid; style sub-terminal; stigma dilated. Female flowers-perianth similar to gall flowers; style hairy, long, curved, lateral; stigma cylindric. Receptacles in fascicles on short thick leafless branchlets borne on the big branches or trunk often much low down, turbinate, often depressed, longitudinally 8-12 ribbed, often as large as 2' long and 3' across, purplish-orange when ripe; basal bracts 3, triangular or ovate, large. Achene minutely tubercled, viscid.

Common throughout the province (upto 5,000 ft.). Fruit is eaten; the leaves are used for elephant and cattle fodder. Ripe fruit 4-6.

40. Ficus pomifera Wall. Takuk-asing, Miri.

A tree, sometimes quite a small tree; young parts pubescent. Bark greyish thin; blaze light-red, exuding gummy latex. Leaves 3-8 by 1-3 in., elliptic or broadly lanceolate, ovate-elliptic, usually acute, coarsely and irregularly serrate, subcoriaceous, glabrous (puberulous when young) above, minutely hairy or glabrous beneath; lateral nerves 3-7 on either half, prominent below; base 3-5 nerved, rounded or sub-cuneate; petiole 1-3 in. long; stipules 0.5-0.8 in. long, ovate-lanceolate. Male flowers-tepals 3, membranous; stamens 2. Gall flower-perianth gamophyllous, 3-toothed; ovary smooth, ovoid; style short, sub-terminal; stigma dilated. Female flowers-perianth similar to gall flowers; style long, lateral; stigma clavate. Receptacle peduncled, in branched fascicles on short leafless branches or tubercles from the trunk or larger branches, sometimes from base, sub-globose or more or less pyriform, depressed, reddish or brownish, red when ripe, 1-1.5 in. across; basal bracts 3, ovate, acute; peduncles 1-2.5 in. long. Achene fairly papillose.

N. E. F. TRACT, SIBSAGAR and K. & J. HILLS (upto 4,200 ft.). Ripe fruit is eaten greedily.

Fr. 1.
41. Ficus glomerata Roxb.

A large deciduous tree; young parts pubescent. Bark greyish-brown, smooth. Leaves 4-7 by 1.5-2.7 in., ovate-elliptic, ovate-oblong or oblong-lanceolate, bluntly acuminate, entire, membranous, glabrous, with numerous minute dots on the lower surface; lateral nerves 4-10 on either half; base 3-nerved, obtuse or acute; petiole 0.6-1 in. long; stipules 0.6-0.8 in. long, ovate-lanceolate. Male flowers—tepals 3-5, membranous, inflated; anthers 2; filaments united. Gall flowers pedicellate; perianth gamophyllous, irregularly toothed; stigma clavate. Female flowers almost sessile; perianth gamophyllous, 4-5 toothed; segments lanceolate; style subterminal; stigma clavate, (all kinds of flowers in the same receptacle). Receptacles peduncled, in short panicked fascicles from the trunk and larger branches, rarely axillary, sub-globose or pyriform, reddish or orange when ripe, 1-1.5 in. across; basal bracts 3, small, triangular, ovate. Achene minutely tubercled.

Common throughout the province (up to 4,000 ft.).

But there is one specimen from K. & J. Hills, No. 2670 (U. N. Kanjilal).

Ripe fruit 4-7.

42. Ficus lanceolata Ham.

A much branched shrub or small tree, almost glabrous. Leaves 4-8 by 0.9-1.5 in., lanceolate or narrow-lanceolate, entire or occasionally very remotely serrate, acuminate, subcoriaceous, glabrous but minutely granulate beneath; lateral nerves 6-8 on either half; base 3-nerved, rounded; petiole 0.4-1 in. long; stipules about 0.5 in. long, lanceolate. Male flowers shortly pedicellated, numerous near the mouth; perianths 3 or 4, large, inflated; anthers 2, ovate; filaments short. Gall flowers—perianth similar to female; ovary ovoid; style short, subterminal; stigma dilated. Female flowers—perianth short, gamophyllous, 3-toothed; style elongate, lateral; stigma clavate. Receptacles glabrous in fascicles of 5-8 on the old wood and large branches, pyriform when young, turbinate and purplish when ripe, 1-2 in. across,
Ficus.

**125. MORACEÆ.**

warty; basal bracts 3, small. **Achene** obliquely ovoid, minutely tubercled.

K. & J. HILLS (upto 4,000 ft.).
Fruits edible and very palatable.

Flrs. Hot season. Fr. 5-6.

**43. Ficus Clarkei King.**

A tall tree. **Bark** whitish; young shoots hispidly scabrid. **Leaves** 6-10 by 2-3·2 in., inequilateral, oblong or narrow-elliptic, entire or with a few coarse tooth near the apex, acuminate, coriaceous, glabrous, minutely tubercled beneath; lateral nerves 6-8 on either half; prominent beneath; base 3-nerved, cuneate or acute, oblique and unequal sided; petiole 1·2-4 in. long; stipules lanceolate, convolute, 1·4-5 in. long. **Male flowers**—perianth of 3 membranous imbricate segments; stamens 2 or 3; anthers ovate, apiculate. **Gall flowers**—perianth gamophyllous, 3-cleft; segments linear, lanceolate; ovary ovoid, slightly tubercled; style lateral, thickened below; stigma cylindric. **Receptacles** in bracteate panicles on old wood or branches, pedunculate, pyriform, red when ripe, about 1 in. across; the base constricted into a long stipe; basal bracts 3, ovate-lanceolate.

**Khasi Hills** (500 ft.). (C. B. Clarke).
No specimen in Forest Herbarium, Shillong.

**F. Wardii C. E. C. Fisch.**

A small tree. **Leaves** alternate, 7-8 by 3·8 in., ovate or elliptic, acute, cuspidate, chartaceous, glabrous; Lateral nerves 14-16 on either half; base rounded, truncate or broadly cuneate; petiole 1·4-1·75 in. long, shallowly channelled; stipules 1·4-5 in. long, lanceolate, acuminate, glabrous. **Male flowers**—pedicel 1·4-5 in. long; perianth segments 3, 1·4-5 in. long, red, boat-shaped, acute, keeled; stamens 2; filaments very short; anthers short, 2-celled; cells margined. **Gall flowers** sessile or nearly so; perianth-segments 3, red, lanceolate, acute, 1·4-5 in. long; gall stipitate, sub-globose; style lateral; stigma capitate, puberulous. **Receptacles** sessile, usually in pairs, nearly globose, shortly pedunculate, 1·1-1·1 in. across, brown, minutely puberulous.

Delei Valley (Kingdon Ward 8048) 6-7,000 ft. (Kew Bull. 956, p. 281).

Flrs. 4.
F. xiphias C. E. C. Fischer.

A small shrub or tree. Leaves alternate, 1·2 by 1 in., narrowly elliptic, oblong, acute, chartaceous; lateral nerves 12-22 on either half; petiole slender, 4 in. long, ultimately glabrous; stipules deciduous, 5 in. long, narrowly lanceolate, acuminate, glabrous. Male flowers—perianth segments 3-4, boat-shaped, obtuse, reddish; stamens 1-2; anthers as big as filaments; pistillode minute. Gall flowers sessile; perianth-segments 4, oblong, boat-shaped, often curved; style lateral, not reaching the apex of the gall, with straight or recurved linear appendage from the side of the rounded apex facing the gall. Receptacles usually 2, in the axils of the leaves, globose on maturity, sharply umbonate, 4 in. across.


Fprs. 5-8.

2. ARTOCARPUS Forst.

Evergreen trees with milky juice. Leaves alternate, coriaceous, entire, lobed, penninerved; stipules usually leaving a prominent and annular scar. Flowers monœcious, densely crowded on globose or variously shaped, usually solitary, axillary. Receptacles often mixed with scale-like or peltate bracts. Male flowers—perianth 2-4 lobed or partite; lobes concave, valvate or sub-imbricate; stamen 1, erect; pistillode absent. Female flowers—perianth tubular, confluent below with the receptacle; limb minute. Ovary straight; style central or lateral; stigma entire, rarely 2-3-fid; ovule pendulous. Fruit a much enlarged fleshy irregularly oblong cylindric or globose syncarp, covered superficially with the thickened and fleshy perianth and apically spinous or otherwise hardened carpels; the achens deeply sunk in. Seeds often large; exalbuminous; embryo straight or incurved; cotyledons fleshy, equal or unequal; radicle superior, short.

Syncarp tubercled:—
Stipules amplexicaul:—
Syncarp globose:—
Leaves scabrid. . . . . 1. A. Chaplasha.

Syncarp not globose (oblong) bigger, hanging on short stalks:—
Leaves smooth, shining. . . . . 2. A. integra.
Syncarp not tubercled (smooth):—
Stipules not amplexicaul:—
Leaves pubescent beneath:—
Fruit globose, velvety, yellow when ripe, 2-4 in. across. .. 3. A. Lakoocha.
Leaves entirely glabrous:—
Fruit globose or ovoid, smooth, •7-1•25 in. across. .. 4. A. Gomeziana.

1. Artocarpus Chaplasha Roxb. Vern. Tat-pong, Lush., Tipp.; Kathlicham, Sylh.; Sam, Ass.; Dieng-laram, Dieng-soh-ram, Khasi; Phong-arong, Mik.; Chirum, Naga; Bol-sam, Garo; Cheram-phang, Kach.

A very large deciduous tree (150'/15'); young shoots dotted with long stiff hairs. Bark greyish-brown, with large white patches and deep vertical furrows peeling off in pieces, older bark when removed exposes a brown surface; cork •25 in. thick; inner bark 1 in. thick; blaze brown; latex milky, copious; leaves of seedlings and saplings or young shoots pinnatifid or lobed. Leaves 6-12 by 3-7 in., elliptic-ovate or sub-rotund, entire or minutely dentate-serrate, obtuse or rounded or slightly cuspidate, thinly coriaceous, sparsely hispid above, hispid-pubescent beneath; lateral nerves 6-10 on either half; midrib and reticulation distinct, pilose or hispid; base sub-cordate, rounded; petiole •5-1 in. long, hispid-tomentose; stipules large, amplexicaul. Receptacle axillary, globose; peduncles long, puberulous. Male flowers sessile, mixed with scales; perianth segments oblong, pubescent, bifid at the apex; anthers exserted, 2-celled; receptacular scales peduncelled, hairy above. Receptacles globose, not lobulate, tuberculate, pubescent, 3-4 in. across; apex of anthocarp free, pubescent. Seeds few, ovoid, •75 in. long.

Fairly common throughout the province.
Wood moderately hard, even grained, durable, very refractory in seasoning (sawn timber); should be seasoned in logs and then sawn up.
Medullary rays short, fine and moderately broad. Pores large and moderate-sized, uniformly distributed (Gamble).
Takes creosote impregnation well; one of the best treated sleepers; used for dug-outs in the Province; fetches very good prices.
Firs. 3-4. Fr. Rainy season.

A large evergreen tree with large dense crown; young shoots with stiff hairs. Leaves 3-8 by 1.5-3 in., elliptic, obovate, entire (lobed sometimes in young plants) shortly acuminate, coriaceous, glabrous, dark green and glossy above, pale and rough beneath; lateral nerves 5-8 on either half; base narrowed into the petiole which is 1.3-1 in. long; stipule sheathing, prominent, leaving annular, scars on the branchlets. Flowers heads in bud enclosed in large leathery deciduous stipulate sheaths. Male receptacle cylindric, 2-6 in. long; sepals 2. Syncarp (fruiting receptacle) 12-30 in. long, covered with pointed tubercles hanging on short stalks. Seeds about 1 in. long, oblong, farinaceous.

Cultivated throughout the province, also commonly found in evergreen forests of UPPER ASSAM as escapes. (38-41 lbs. per c.ft.).

The wood is used for furniture, carpentry, boxes. The wood is at first yellowish and later somewhat resembles Mahogany. A yellow dye is extracted from decoction of heart wood chips with leaves of tamarind and is used for dyeing Endi-silk. The green young fruits and ripe seeds are eaten cooked as vegetable. The sweet and flavoured pulp of the fruit is also eaten throughout India.

Flrs. 2-4. Fr. 7-9.


A large deciduous tree with a large spreading crown; young parts tomentose. Bark dark-brown, exfoliating in small round woody plates; inside reddish, softly fibrous, with faint streaks of white latex; milky juice copious. Leaves 4-12 by 2.6-5 in., elliptic or broadly oblong, entire, abruptly and shortly acuminate, acute or obtuse, coriaceous, glabrescent and rough above, softly pubescent beneath; lateral nerves 6-14 on either half; tertiaries prominent; base attenuate, rounded or obtuse; petiole 5-1.5 in. long. Receptacle
axillary, globose on short pubescent peduncles. Male receptacles 0.5-1 in. across, puberulous; perianth segments 2 (rarely 3) triangular, truncate, puberulous; anthers exserted, 2-celled, longitudinally dehiscent. Female receptacle 12-4 in. across, irregularly lobulate; velvety, yellow or orange-red when ripe, wrinkled or smooth; style protruding. Anthocarp completely united. Seeds broad, about 0.5 in. across.

Common throughout the Province, often cultivated in villages. The bark is chewed with Pan (betel). The ripe fruits are edible. The male flower heads are pickled. The wood resembles that of A. integra, but is somewhat inferior, takes a good polish and seasons well (weight about 36 lbs. per c.ft.).

Flrs. 2-5. Fr. Rainy season.


A tall evergreen tree; young shoots puberulous. Bark covered with grey papery soft cork which splits into parallel vertical fissures; inside light-red with streaks; milky latex copious. Leaves 4-9 by 1.5-3.5 in., oblong or ovate-lanceolate or ovate-oblong, usually entire, acute or acuminate, cuspidate, coriaceous, shining, glabrous, smooth above, sometimes sub-pruinose beneath; lateral nerves 7-12 on either half, stout and prominent below; so are the midrib and reticulations; base attenuate, obtuse or rounded; petiole 2-5 in. across. Flowers intermixed with numerous pedicellate peltate scales; perianth segments 2, ovate, pubescent; stamen 1; filaments dilated at the apex; anthers exserted; cells transversely dehiscent, divergent. Female receptacle globose or ovoid, 0.75-1.25 in. across. Anthocarp completely united, only a few bearing seeds.

LAKHIMPUR.
The timber is said to be quite valuable.

Flrs. 6-10. Fr. 1-3.

Var. Griffithii. Leaves 3-6 by 1.1-8 in., elliptic-lanceolate or elliptic-oblong, smaller in all its parts than the forma typica.

LUSHAI HILLS (B. Sen Gupta's No. 7643).

Flrs. 7-9. Fr. 7-3.
3. CUDRANIA Tredul.

Shrubs or small trees, scandent or erect. Leaves alternate, entire, penninerved; stipules small, lateral. Flowers dioecious, sessile, in small globose receptacles, bracteolate. Male flowers—tepals 3-5, imbricate, oblong, obtuse, adnate to the bracts; stamens 4, erect, more or less adnate to the tepals; pistillode subulate or obsolete. Female flowers—tepals broader than the male, distinct, embracing the ovary. Ovary straight; style simple or 2-partite, one arm often slender or rudimentary; ovule pendulous. Fruit of numerous achenes, enclosed in the enlarged and fleshy pseudocarp formed of the accrescent bracteoles and perianth. Achenes compressed, crustaceous; testa membranous; albumen scanty; cotyledons twisted or folded, equal or unequal, embracing the slender ascending radicle.

Young branches pubescent:—
Leaves upto 3·5 in. long, obtuse or acute:—
Lateral nerves 6-10 on either half, slender. . . . . . . . . . . 1. C. javanensis.

Young branches glabrous:—
Leaves upto 6 in. long, caudate-acuminate:—
Lateral nerves 3-5 on either half, prominent beneath. . . . . . . . . . . 2. C. fruticosa.


A large rambling or subscandent evergreen spinous shrub or a small tree; young shoots pubescent. Bark smooth, lenticellate, yellowish-brown or cinerous, exfoliating in thin flakes; thorns axillary, straight or somewhat curved; latex profuse, pale yellow. Leaves 1-3·5 by 7-2 in., variable, elliptic-ovate or oblong-elliptic, mucronate, rounded, acute or obtusely acuminate, entire, coriaceous, glabrous, dark-green above, paler beneath; lateral nerves 6-12 on either half, slender, pairs forming intramarginal loops; base usually acute, sometimes sub-obtuse; petiole 1·3 in. long (Local specimen); stipules minute. Flower heads 2-3 in. across, greenish or yellowish. Male flowers yellow; tepals usually 5, obovate, inflexed at the tips. Female
flower heads 3 in. across; tepals 4, obovate-oblong, thickened and softly tomentose at the tips. Fruit globose, 1-1.2 in. across, velvety and orange when ripe.

Common throughout the province.
Ripe fruits are eaten. The heart wood gives a yellow dye.

Flrs. 4-6. Fr. 7-11.


A scandent or rambling shrub; stem yellowish-green; branches glabrous, greyish, lenticellate; spines curved; latex milky. Leaves 1.5-6.5 by 8-1.5 in., lanceolate, elongate-elliptic or somewhat oblong, entire, abruptly caudate-acuminate, rather membranous, glabrous; lateral nerves 3-5 on either half, stout, prominent beneath, arcuate; base rounded; petiole 2-5 in. long. Flowers heads puberulous. Female heads in pairs on stout peduncles. Fruit glaucous, green, velvety, the size of a cherry; achenes protruding.

K. & J. HILLS (4,000 ft.).
The spines are said to be poisonous.

Fr. 1.

4. BALANOSTREBLUS Kurz.

Balanostreblus ilicifolia Kurz.

A spinous shrub, about 15' in height, often gregarious in patches; sap watery; branchlets divaricate, glabrous. Leaves 1.5-4 by 5-2 in., oblong or elliptic-oblong, acuminate, spinescent-dentate, rigidly coriaceous, glabrous, green above, slightly paler beneath; midrib impressed above, prominent beneath; lateral nerves 8-10 on either half; nerves laxly reticulate; base shortly cuneate; petiole 1-2 in. long, transversely verrucose; stipules triangular, caducous. Male flowers in cylindric catkin-like spikes. Female flowers in pendent racemes (about 1.2 in. long); rachis stout, puberulous; bracts minute; pedicels 1-12 in. long, hispid; perianth about 17 in. long; base connate with ovary; ovary fleshy, glabrous;
style .04 in. long. Fruit a globose drupe, enclosed in the fleshy perianth.

LUSHAI HILLS (U. N. Kanjilal's No. 4757).

Flrs. 3.

5. CONOCEPHALUS Blume.


A large ever-green climber; stem woody. Bark darkish-grey with white patches, 1 in. thick; blaze reddish, turning brown; wood cream coloured. Leaves alternate, 3-10·5 by 2·5 in., elliptic, ovate-oblong or ovate-elliptic, acuminate, entire, sub-coriaceous, glabrous, sometimes puberulous beneath; cystoliths dotted above and as raised lines beneath; lateral nerves 8-12 on either half, parallel, more conspicuous beneath; base usually rounded; petiole 1-6·5 in. long; stipules large, deciduous, brownish. Flowers fragrant, dioecious, in axillary usually cymose dense globose heads. Male flowers heads 25 in. across, peduncled, in dichotomous cymes; flowers sessile; perianth segments 4, obovate, spatulate; stamens 3-4; pistillode small. Female flowers pedicelled; heads 1 in. across, usually 4-6, in short cymes; perianth tubular, 4-cleft; ovary included; style undivided. short; ovule erect, orthotropous. Seeds erect; testa membranous; embryo straight; cotyledons equal; radicle superior.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, DARRANG, GOALPARA, KAMRUP, GARO HILLS, K. & J. HILLS, NAGA HILLS & LUSHAI HILLS (upto 4,000 ft.).

Leaves are eaten, cooked.

Flrs. 1-3. Fr. 3-4.

6. MORUS Linn.

Trees or shrubs. Leaves alternate, entire, toothed or lobed; base 3-5 nerved; stipules small, caducous. Flowers monoeccious or dioecious, spicate; tepals 3-4, imbricate. Male spikes catkin-like; stamens inflexed in bud; pistillode
turbinate. *Female spikes* long or sub-globose; tepals accrescent in fruit, more or less fleshy and swollen enclosing the achene, confluent into a syncarp. *Ovary* 1-celled, straight: style 2-partite; ovule pendulous. *Seed* sub-globose; albumen fleshy; embryo incurved; cotyledons oblong, equal; radicle incumbent, ascending.

Spikes short, usually less than 2 in. long:—

Leaves caudate-acuminate:—

Tepals 4; 2 inner flat; outer more or less keeled:—

Style connate high up:—

Fruit blackish. .. .. 1. *M. indica.*

Leaves shortly acuminate:—

Tepals 3 or 4; hyaline, equal, oblong:—

Style connate below:—

Fruit purple. .. .. 2. *M. serrata.*

Spikes 2-5 in. long:—

Style papillose, bifurcate from near the base:—

Fruit yellowish, insipid, sweetish. .. 3. *M. lœvigata.*


A moderate-sized deciduous tree, occasionally a shrub. *Bark* brownish; blaze whitish, exuding copious milky latex. *Leaves* 1-5 by 7-2·5 in., ovate, caudate-acuminate, sharply serrate, obtuse, lobed, membranous, scaberulous (pubescent when young); base 3-nerved, truncate, rounded or cordate; petiole ·5-1·5 in. long. *Flowers* appear with young leaves. *Male spikes* ·5-1·5 in. long, laxly flowered, hairy; tepals elliptic. *Female spikes* ·2-·5 in. long; tepals 4, obovate; styles long, hairy, connate below. *Fruit* ovoid or sub-globose, ultimately blackish.

GOALPARA, KAMRUP, SIBSAGAR and K. & J. HILLS. Often cultivated for the leaves to rear silk worms. Wood yellowish, hard, weight 45 lbs. per c. ft. Ripe fruit is eaten.

Flrs. 2-5. Fr. 4-7.

A large deciduous tree. *Branches* lenticellate; young shoots pubescent; bark brownish. *Leaves* 2-8 by 1·5-6 in., broadly ovate, toothed or serrate, often variously lobed, shortly acuminate, membranous, glabrous or slightly pubescent above, thickly tomentose beneath; base; cordate, 3-nerved; petiole 1-1·7 in. long, tomentose. *Flowers* dioecious; male spikes 1-2 in. and female spikes 5-7 in. long. *Style* very hairy, connate below. *Fruit* 7-1 in. long, mucilaginous, purple.

Cultivated in K. & J. HILLS.

Heart wood yellow or brown, moderately hard, weight about 35 lbs. per c. ft. It seasons well and takes a fine polish and is used for agricultural implements and cabinet work.

The fruits are sweet and are edible. The leaves are cattle fodder and silk worms are also reared on them.

Frs. 3-5. Fr. 6-9.


A large tree (90'/120''); young parts softly hairy: branches covered with horizontal lenticels. *Bark* of young trees brownish grey, but of mature trees rough, dark-brown, splitting in square flakes; inside whitish but coarsely mottled to connective layers of brown; latex milky, copious. *Leaves* 3-8 by 2·5-5 in. ovate, finely serrate or serrulate, membranous, harsh and scaberulous above, glabrous beneath; lateral nerves 5-8 on either half; base 3-nerved, cordate, truncate or rounded, often oblique; petiole 5-1·5 in. long; stipules softly hairy. *Spikes* elongated, 3-5 in. long, drooping. *Male spikes* hairy, flowers sessile; tepals hairy. *Female spikes* almost glabrous; tepals 2, outer keeled, inner flat; style papilllose bifurcate from near the base. *Fruit* yellowish, insipid, 3-6 by 3 in., in cylindric syncarps.
Common throughout the Province.

Wood hard, even grained, seasons well and takes a fine polish; medullary rays fine, uniform. A most valuable timber in the Province and is the best furniture wood; compares well with teak. Milky juice is used as a plaster for sores.

Ftrs. 2-3. Fr. 4-5.

7. **BROUSSONETIA** Vent.

*Broussonetia papyrifera* Vent.

A fast growing middle-sized deciduous tree. *Bark* greyish-smooth; young parts pubescent. *Leaves* alternate, some opposite, 3-9 by 2-6 in., very variable, obovate or ovate-acuminate, lobed or not, crenate, dentate, rather membranous, scabrid above, tomentose beneath; base 3-nerved, sometimes oblique, cordate or rounded; petiole 1·5-4 in. long; stipules lateral, lanceolate, about 8 in. long, caducous. *Flowers* dioecious, axillary. *Male flowers* yellowish, spicate; perianth 4-fid; segments valvate; stamens 4, inflexed in bud. *Female flowers* reddish in globose pedunculate heads; perianth ovoid, 2-4 lobed; bracts clavate; style filiform, pinkish; ovary stalked; ovules pendulous. *Fruit* a head of achenes, reddish when ripe.

KHASI HILLS (probably introduced).

Wood very soft and light. Bark yields a fine fibre which is manufactured into paper in Japan.

Ftrs. Hot season. Fr. Rainy season.

8. **ALLÆANTHUS** Thwaites.

*Allæanthus Kurzii* Hk. f.

A large deciduous climber, glabrous; young shoots minutely pubescent. *Leaves* 3-5 by 1-2 in., oblong or ovate-oblong, acuminate, dentate, subcoriaceous, glabrous; lateral nerves 6-8 on either half; base rounded or truncate; petiole 2-5 in. long; stipules deciduous. *Flowers* dioecious. *Male flowers* in pedunculate fascicled spikes; sepals 4; bracteoles 3-4, hyaline, supporting each flower. *Female flowers* in globose heads (4-6), usually racemose, minutely pubescent; perianth lanceolate; perianth and bracteole confluent into a fleshy mass in which the ovaries are imbedded (Brandis);
style long; stigma filiform. Syncarps fleshy, ·3 in. across. Seeds ellipsoid, ·16 in. long, exalbuminous; embryo curved; cotyledons folded; radicle incumbent.

SIBSAGAR (U. N. Kanjilal), GOALPARA (C. B. Clarke).

9. PSEUDOSTREBLUS Bureau.


A handsome middle size evergreen tree, with milky juice. Bark whitish or greenish-grey, with scatterel warts; inside dull-white, soon turning greenish black, with strong fibrous layers, ·16··2 in. thick; milky sap turns black. Leaves bifarious, alternate, 2-7 by 1-2 in., narrow, elliptic, acuminate, coriaceous, glabrous, dark-green above, paler beneath; lateral nerves 10-20 (with many intermediate ones) on either half, straight and parallel, ultimately forming several loops of intramarginal nerves; base acute; petiole ·2··5 in. long; stipules ovate lanceolate. Flowers monocious, axillary. Male flowers in cymes. Female flowers solitary or mixed with the male; sepals 4, orbicular, concave, accrescent, enclosing the fruit. Fruit 1-celled, about ·3 in. in across. Seeds white.

CACHAR & KHASI HILLS (upto 5,000 ft.).

Fruit edible. Wood cream coloured, with slight yellowish tinge, hard, close-grained, takes a very fine polish. This timber deserves attention in Surma Valley.

Flrs. 6-8. Fr. Cold season.

10. STREBLUS Lour.


A small rigid evergreen tree, with milky juice, often gnarled. Bark greyish-white, warty and wrinkled, ·16 in. thick, green below the cuticle; blaze cream coloured, turning dirty brown, ultimately blackish. Leaves alternate, 1-4 by ·8··1·5 in., elliptic, rhomboid or obovate, acute. obtuse or abruptly and shortly acuminate, more or less serrate or irregularly toothed, coriaceous, scabrid; lateral nerves 4-6 on
either half, more conspicuous beneath, joined by intramarginal loops; base cuneate; petiole ·05·2 in. long, pubescent; stipules lanceolate, acuminate. Flowers generally dioecious, axillary. Male flowers in globose pedunculate heads; perianth campanulate; sepals 4, imbricate; stamens 4, inflexed in bud head sometimes androgynous, (U. N. Kanjilal). Female flowers solitary, pedunculate; perianth embracing the ovary; sepals 4, enlarged in fruit; style filiform. Berry 1-seeded, globose, ·2 in. across, yellow when ripe.

Common throughout the Province.
Wood moderately hard (40 lbs. per c. ft.) used in making yokes. The fruit is edible when ripe. The twigs are used for cleaning the teeth. Leaves are used to polish wood and the milky juice is medicinal.

Flrs. 2-4. Fr. 5-7.

11. TAXOTROPHIS Blume.


A small thorny tree, 20-25 feet high, with milky juice; young branchlets puberulous. Leaves 2-7 by ·8-1·6 in., somewhat elongate-ovate or oblong-elliptic, crenate-serrate towards the apex and entire towards the base, chartaceous, glabrous; nerves more conspicuous below; lateral nerves 7-10 on either half, arcuate; base rounded; petiole ·1·2 in. long, terete; stipules connate, lanceolate. Male inflorescence short, puberulous; perianth-segments ovate, obtuse; anthers primarily much inflexed, ultimately erect; filaments glabrous, slender; pistillode rudimentary, glabrous, conical. Female inflorescence axillary, 3-4 flowered; pedicel ·2 in. long, (·6 in. long, in fruit); perianth-segments 4, sub-acute, glabrous, somewhat accrescent. Ovary somewhat oblique, style thick; arms hispid. Fruit globose, black, about ·25 in. across.

NOWGONG—Lumding, Nov. 10, 1913. (Kanjilal’s No. 2904).

Flrs. 9. Fr. 10-11.
FAM. 125(a). CANNABINACEÆ.

(Engler. in Engl. U. Prantl.)
(Urticaceæ Tribe III Cannabinæ Gen. Plant.)

Shrubs or herbs, sometimes climbing, without milky juice, often secreting aromatic resin. Leaves palmately nerv-ed; stipules free, persistent. Flowers dioecious; male flowers in cymes; sepals 5, imbricate; filaments straight in bud; pistillode 0; female flowers in compact cymes or heads, bracteate; perianth entire, reduced. Ovary of 2 carpels 1-celled; stigma 2, large, feathery; ovule solitary, pendulous, anatropous. Fruit an achene; embryo curved or spiral; albumen present or absent.

A strong smelling annual of very variable height. Leaves 3-8 in. long, palmately-partite; lobes narrow-lanceolate, serrate. Flowers greenish.

Common throughout ASSAM.
It is the source of ganja, charas and bhang. Ganja consists of the dried resinous flowering shoots of specially cultivated female plants by exclusion of male plants, so that the flowers may not be fertilized. Charas is the natural exudation from the various parts of the plants which is produced in plants growing in cold climate (Katamunda, Yarkand, etc.). It is largely imported and contains a large proportion of the active principle and is more narcotic. Bhang consists of the dried leaves and flowering shoots from plants growing wild.
The bust fibre yields the true Hemp. Officinal in the Indian as well as British Pharmacopœas.

Flrs. & Fr. Cold season.

Humulus Lupulus Linn. The Hop—largely cultivated.
A perennial twining scabrid herb. It is officinal in India and British Pharmacopœas.
The fruit is used in brewing.
FAM. 126. URTICACEÆ.

Herbs or undershrubs, rarely shrubs or trees, without latex, sometimes furnished with stinging hairs. *Leaves* opposite, alternate, often bifarious, with 3 basal nerves and opaque dots due to the presence of cystoliths; stipules membranous, sometimes interpetiolar. *Flowers* small greenish, 1-sexual, in cymose inflorescence, often condensed into pseudo heads. *Male flowers* perianth 4-5, free or united, sepaloid, infrequently 2-3 merous; stamens as many and opposite to the perianth lobes, incurved in bud, exploding when ripe; anthers 2-celled, with broad connective, dorsifixed; pollen spherical; pistillose usually present. *Female flowers* perianth gamophyllous, 4-5-lobed, sometimes accrescent and fleshy in fruit. *Ovary* superior, 1-celled; ovule 1, basal, orthotropous. *Fruit* a drupe or utricle, often united to the perianth. *Seed* usually with rich oily albumen; testa membranous; embryo straight.

“Bast-fibres strongly developed in the bark, often very long.” (Brandis).

Hairs stinging (at least those on inflorescence) :—

*Flowers* cymose :—

*Leaves* alternate :—

*Female perianth* 4-phyllophous or deeply 4-lobed; *ovary* oblique :—

*Stigma* ovate or linear, hooked, sometimes appendaged at base :—

Herb. . . . . . . 1. *Fleurya*.

*Stigma* linear, papillose on one side :—

Shrubs or trees. . . . . 2. *Laportea*.

*Female perianth* tubular. 2-3-toothed; *ovary* straight. . . . . 3. *Girardinia*.

Hairs not stinging :—

*Female tepals* 3, rarely 4, very small and unequal, sometimes hooded or gibbous :—

*Stigma* penicellate :—

*Leaves* opposite . . . . 4. *Pilea*.
Fleurya.  

Female tepals 2-4, very minute or obsolete:—  
Stigma penicillate:—  
Leaves alternate. . . . . . 5. Elatostema.  

Hairs not stinging:—  
Female perianth tubular, ovoid or campanulate:—  
Fruiting perianth dry:—  
Stigma persistent. . . . . . 6. Bœhmeria.  
Stigma deciduous. . . . . . 7. Pouzolzia.  
Fruiting perianth more or less succulent:—  
Ovary free. Leaves narrow; stigma penicillate:—  
Perianth obliquely campanulate. 8. Sarcochlamys.  
Ovary adnate. Leaves broad:—  
Perianth ovoid:—  
Stigma sessile, sub-peltate, ciliate:—  
Leaves green beneath. . . . . . 9. Oreocnide.  
Stigma penicillate:—  
Leaves white or grey beneath. 10. Debregeasia.  

Female perianth 0:—  
Young shoots silky:—  
Leaves white felted beneath. . . . . . 11. Maoutia.  

URTICA Linn.  

URTICA parvi flora Roxb.  
A slender perennial (root) herb; branches angled. Leaves variable, 2-4 by 1.5-3 in., ovate-cordate, acuminate, doubly crenate or serrate, membranous, covered with copious stiff stinging hairs; petiole upto 2.5 in. long; stipules connate. Flowers monoecious, in short peduncled cymes forming an erect terminal panicle. Male and fruiting sepals hispid.  

NAGA HILLS (Kohima).  
Flrs. and young fruits 2.  

1. FLEURYA Gaud.  
Fleurya interrupta Gaud.  
A nettle-like erect herb, with stinging hairs. Leaves with linear cystoliths, alternate, 5-6 in. long, ovate, acuminate, coarsely toothed with bulbous based hair above, glabrous beneath except on the nerves; base 3-nerved; subcordate, truncate or cuneate; petioles longer than the blade; stipules

**KHASI HILLS** (Griffith).

Flrs. & Fr. Autumn.

### 2. LAPORTEA Gaud.

Trees, shrubs or herbs with (sometimes very minute) stinging hairs. *Leaves* alternate, entire or toothed, palminnerved or penninerved; stipules free or connate. *Flowers* monoecious or dioecious, in paniculate usually unisexual cymes or racemes; upper cymes usually very long and male flowers and fruits often reflexed. *Male flowers*—tepals 4-5, sub-valvate; stamens 4-5, reflexed in bud; pistillode clavate or sub-globose. *Female flowers* perianth segments 4, sub-equal or outer small, sometimes absent. *Ovary* at length oblique; style linear, papillose on one side. *Achene* oblique, compressed or flattened, membranous or fleshy, seated on the perianth, sometimes obliquely stipitate. *Seed* sub-exalbuminous; cotyledons broad.

A herbaceous stemmed shrub.  
A tree.  


A herbaceous stemmed shrub; young parts clothed with stinging hairs. *Leaves* 6-14 by 3-5 in., ovate or elliptic, more or less entire, sometimes crenulate towards the apex, acute or acuminate, clothed with stinging hairs, penninerved; base rounded or cordate; petiole stout, 1-4 in. long. *Urticle* inflated, white.

Throughout the Province (upto 4,000 ft.).

The sting of the nettle is very virulent.

Flrs. 8-10. Fr. Cold season.

A large tree (60'/120''). *Bark* whitish with vertical lines of lenticels and distant horizontal wrinkles; stem buttressed at base; bark 7 in. thick, very soft, white inside; wood very soft. *Leaves* 8-12 by 6-5-8 in., ovate or broadly-elliptic, more or less entire, acute or somewhat acuminate, subcoriaceous, palminedved; base rounded or truncate; petiole 6-8 in. long, stout.

N. E. F. TRACT.

Flrs. and Young fruit 2.

*L. terminalis* Wight. is also reported from NAGA HILLS (Kohima).

3. **GIRARDINIA** Gaud.


A tall stout coarse soft stemmed undershrub, armed with numerous slender stinging hairs. *Leaves* 4-8 by 2-5-4 in., or as long as broad, lobed, coarsely dentate or serrate, membranous, pubescent, 3-nerved; base cordate; petiole 8-3 in. long; stipules intrapetiolar, connate, foliaceous, membranous. *Male flowers* 4-merous, in short axillary spikes; tepals valvate; filaments persistent; pistillode globose. *Female flowers* in compact capitate panicles; perianth tubular, ventricose, 2-3-toothed, ultimately splitting, spathaceous. *Achene* broad, compressed, 15 in. across; testa membranous; albumen scanty; cotyledons broad.

N. E. F. TRACT, N. C. HILLS. MIKIR HILLS (Siibsagar) and K. & J. HILLS (5,500 ft.).

Flrs. 9. Fr. 11.

*G. zeylanica* Dcne. is also recorded from NAGA HILLS (Kohima).

Flrs. 8.

4. **PILEA** Lindl.

*Pilea smilacifolia* Wedd.

A stout undershrub, woody below; stem angled; dioecious. *Leaves* opposite, 4-8 by 1-3-2-2 in., elliptic-
lanceolate, entire, acuminate, membranous, glabrous; base, 3-nerved, the 2 basal nerves converging nearly to the apex; narrowed into the petiole (1-3 in. long); stipules intrapetiolar, persistent. Cymes variable, shortly peduncled, often in pairs. Male flowers minute; sepal 2-4, free or connate, cupular; stamens 2-4; pistillode conical or oblong. Female flowers tepals 3 rarely 4. Ovary straight; stigma sessile, penicellate. Achene ovoid, compressed, 0.05 in. long. Seeds erect; testa thin; albumen very scanty; cotyledons broad.

SIBSAGAR.

Flrs. 4. Fr. Rainy season.

P. umbrosa Wedd.

Herbaceous, more or less pubescent. Leaves broadly elliptic, ovate, more often acuminate, crenate-dentate, 3-nerved at base; base oblique, rounded or shallow cordate; petiole 1-2 in. long. Cymes various; peduncles 2-3 in. long. Male flowers small; perianth without spur. Female perianth largest. Achenes 0.03 in. across minute, flattened, often with raised intra-marginal ridge.

KHASI HILLS 4-6,000 ft.

Flrs. 8. Fr. 9-10.

The following herbaceous species are also recorded from the region of the flora:—P. anisophylla Wedd., P. insolens Wedd., P. lancifolia Hk. f., P. peploides Hk. f. & Arn., P. scripta Wedd., P. Hookeriana Wedd., P. pachycarpa Wedd., P. obliqua Hk. f., and P. thalactrifolia C.B.C.

Lecanthis Wightii Wedd.

A small succulent herb. Leaves opposite. 2-2.5 by 0.5-1 in., ovate, somewhat oblique, acute or shortly acuminate, dentate, membranous, glabrous; base 3-nerved; petiole upto 2.5 in. long. Flowers heads long peduncled (upto 5 in. long—local specimen). Receptacle 4 in. across. Achene much compressed, ovoid.

KHASI HILLS, NAGA HILLS & MANIPUR.

5. ELATOSTEMA Forst.

Herbs or undershrubs. Leaves alternate or sometimes with a minute leaf sub-opposite to the normal leaf, distichous, sessile or sub-sessile, usually very oblique and inequilateral, 3-nerved from the base or shortly above it;
stipules lateral or intrapetiolar. Flowers very minute, monoeious or dioecious, crowded on sessile or peduncled unisexual usually involucrate receptacles; bracts rounded, oblong or ovate, outer at times with a dorsal spur or horn, base nearly free or more or less confluent in a fleshy circular or lobed disk, the tips projecting from its margin, entire; bracteoles densely crowded, oblong in males, spatulate in females. Flowers often clustered in the heads, each cluster surrounded by a partial bracts and the head is then lobulate. Male flowers sepal 4-5; 2 or more, usually tubercled or spurred on the back; stamens 4-5, inflexed in bud; pistillode minute. Female flowers sepals 3-5, very minute, much shorter than the ovary, persistent; staminodes minute or 0. Ovary straight; ovule erect; stigma penicillate. Fruit a minute ellipsoid or fusiform usually ribbed achene subtended by the minute perianth. Seeds exalbuminous; testa membranous; cotyledons ovate or semi-cylindric.


Shrubby, usually pubescent, 6-8 ft. high; stem woody, hollow, often climbing. Bark blackish-green. Leaves 3-7 by 1-1.5 in., ob lanceolate, greenish, coarsely serrate, acuminate, membranous, glabrescent above, pubescent on the nerves beneath; petiole 0.1 in. long.

K. & J. HILLS (4,500 ft.).

Flrs. 4.

**E. rupestre** Wedd. Shrubby, stout, rigid, 6-10 ft. high. Leaves 3-6 by 1.3-2.5 in., elliptic, elliptic-lanceolate or broadly elliptic, acute or acuminate, serrate, coriaceous; petiole 1-1.5 in. long, cystoliths crowded.

K. & J. HILLS (4,500 ft.).

Flrs. 3.

**E. sesquifolium** Hask. A branching undershrub; lower parts woody. Leaves 3-10 by 1.2-2 in., oblong-elliptic or elliptic-lanceolate, quite entire, cuneate-acuminate, coriaceous; petiole 2.1 in. long. Male-receptacle sessile or sub-sessile.

K. & J. HILLS.

Flrs. 3-4. Fr. 6-7.

**E. lineolatum** Wight. An undershrub or herbaceous perennial. Leaves 1.5 by 5-1.5 in., oblong, oblong-lanceolate, elliptic-
obovate, entire or coarsely crenate or serrate above the middle. acuminate; petiole 0·1 in. long. Receptacle sessile.

K. & J. HILLS.

Ftrs. 5. Fr. 7.

**E. platyphylla** Wedd.

A stout tall undershrub. *Leaves* 6-7 by 1·5-2 in., (Local specimen) oblique, elliptic-lanceolate, caudate-acuminate, (acumen upto 3 in.) sub-coriaceous, serrulate, scaberulous above, glabrescent beneath (cystolith crowded); base, oblique cuneate; lateral nerves 4-5. on either side (2 from near the base); petiole ·5 in. long; stipule about ·8 in. long. *Male receptacle* lobed. *Female flowers* ·3 in. across. somewhat pubescent. Achenes ovoid.

KHASI HILLS & NAGA HILLS (upto 6,000 ft.).

Ftrs. & Fr. 2 and later.

The following species of Elatostema are also recorded from the region of this "Flora."

- E. ficoides Wedd.
- E. molle Wedd.
- E. acuminatum Brong.
- E. Stracheyanum Wedd.
- E. Hookerianum Wedd.
- E. dissectum Wedd.
- E. Griffithii Hk. f.
- E. papillosum Wedd.
- E. Clarkei Hk. f.
- E. procrisoides Wedd.
- E. decipiens Wedd.
- E. surculosum Wight.
- E. obtusum Wedd.
- E. cornutum Wedd.


A herbaceous epiphytic undershrub. *Leaves* (minute leaves also occur alternate or sub-opposite to the normal leaves) 5-8 by 1-1·5 in., long, lanceolate or orb-lanceolate, acuminate, entire or distantly crenate towards the apex, membranous, glabrous, green above, pale-grey beneath; lateral nerves 7-11 on either half, slender; base oblique, unequal sided, narrowed into the petiole, (·2- ·4 in. long). *Male flowers* 4-5 merous, in small scanty axillary cluster; pistillode purplish. *Females* on a receptacle; sepals 3-5; staminode 0; stigma penicellate. Achenes ovoid, slightly compressed.

K. & J. HILLS, MISHMI HILLS (Griffith.) & MANIPUR (Clarke) upto 4,000 ft.

Ftrs. Rainy season. Fr. Cold season.

**6. BŒHMERIA** Jacq.

Shrubs or small trees. *Leaves* opposite or alternate, toothed, palmately 3-nerved; stipules usually free, deciduous. *Flowers* unisexual, in clusters which are axillary or arranged in interrupted axillary spikes, racemes or panicles; bracts small, scarious. *Male flowers*-perianth 3-5-lobed or partite,
valvate; stamens 3-5, inflexed in bud; pistillode clavate or globose. *Female flowers* perianth tubular, 2-4-toothed, sometimes angled, winged or ventricose in fruit. *Ovary* included; ovule erect; stigma filiform, persistent. Achene crustaceous, closely invested by the perianth, at length free and dry; testa thinly membranous. *Seeds* albuminous; cotyledons ovate.

Flowers in clusters:—
Leaves all alternate, glabrous above, pubescent beneath:—
Achene ovoid:—
A small tree or shrub. ... 1. *B. malabarica*.
Leaves alternate or sometimes opposite, usually hispid on both surfaces:—
Achene oblong-compressed:—
A slender diffuse undershrub. ... 2. *B. sidiformia*.

Flowers-clusters arranged in simple or paniced spikes:—
Leaves alternate:—
A shrub with herbaceous branches:—
Leaves scabrid above, snow-white beneath except the nerves. ... 3. *B. nivea*.
Leaves usually opposite; petioles unequal in 1 pair:—
Leaves narrowly lanceolate, coriaceous; petiole 3-3 in. long. ... 4. *B. macrophylla*.
Leaves broadly elliptic or ovate, rather membranous, sometimes alternate or ovate-cordate; petiole 1.5-5 in. long. ... 5. *B. platyphylla*.
Leaves lanceolate, membranous, opposite, lanceolate or oblong-lanceolate; petiole 3-2.5 in. long:—
Achene glabrous. ... 6. *B. Hamiltoniana*.
Leaves broadly ovate, coriaceous, sometimes alternate or ovate-cordate; petiole 2-5 in. long:—
Achene hispid. ... 7. *B. polystachya*.


An erect shrub or a small tree; branches spreading. Bark greyish, rough, thin. *Leaves* alternate, 2-8 by 1-5 in., sub-equal or alternately large and small, ovate, ovate-
lanceolate or elliptic-lanceolate, crenate or serrulate, acuminate, membranous, glabrous above, pubescent beneath; strongly 3-nerved; base sub-acute, rounded or shallow-cordate; petiole 3-4 in. long; stipules small, deciduous. *Flowers* greenish-white in axillary sessile clusters, 16-25 in. across. *Male flowers* perianth 4 partite, stamens 4; pistillode small, sub-globose. *Female flowers* perianth 4-toothed, pubescent. *Achene* minute, ovoid, closely invested by the perianth.

SIBSAGAR, NOWGONG, N. E. F. TRACT & K. HILLS.
Fairly common throughout the Province.
Cattle fodder.

Frs. Cold season. Fr. 1-3.

2. *Bœhmeria sidæfolia* Wedd.
A slender diffuse undershrub; young parts hispid. *Leaves* opposite and alternate 1-4.5 by 6-1.7 in., ovate-lanceolate or elliptic, sharply serrulate, acuminate, membranous, hispid on both sides; base obtuse or rounded; petiole 2-1 in. long. *Flowers* clusters hispid, often on naked branchlets terminated by a tuft of leaves. *Achene* oblong, compressed, hispid.

N. C. HILLS, GARO HILLS, K. & J. HILLS (cpto 4,000 ft.) & Mishmi Hills (Griffith).
Frs. & Fr.: Cold season.

A shrub with herbaceous branches, tomentose. *Leaves* 2-6 by 1.5-4 in., broadly ovate or suborbicular, acuminate, dentate, sub-coriaceous, scabrid above, white beneath (except the nerves), densely matted with adpressed hairs; 3-nerved; secondary nerves to the midrib 3-4 on either half towards the apex; base cuneate or rounded; petiole 6-3.5 in. long; stipules subulate, deciduous. *Flowers* greenish, monocious, in axillary unisexual panicled clusters. *Female flowers* perianth—upper; style exserted, hairy. *Achene* oblong compressed hairy.

It is indigenous and cultivated in CHINA and JAPAN.
Cultivated in ASSAM for the fibre, which is obtained from the inner
bark and is perhaps the longest and most silky of all vegetable fibres. Great skill is required for preparing the fibre (often running wild).

Ffrs. & Fr. Cold season.


A small tree or a large shrub. Bark dark-brown; branchlets 4-angled; young parts strigose. Leaves opposite, 4-12 by 1-3 in., narrow lanceolate, caudate acuminate, serrulate, glabrescent or pustular and rugose above, paler underneath and thinly strigose on the nerves; the basal nerves converging nearly to the apex; base obtuse or rounded; petiole 3-3 in. long, strigose; stipules narrow-lanceolate, about 5 in. long, caducous. Flowers monœcious in dense clusters (18-25 in. in across), arranged in drooping spikes about as long as the leaves. Male flowers perianth 4-lobed; stamens 4; pistillode rudimentary. Female flowers perianth 2-4-toothed, persistent; style laterally stigmatose. Achene closely invested by the perianth; fruiting perianth obovate, cuneate, suddenly constricted upwards to the 2-4-toothed neck.

KAMRUP & K. & J. HILLS (4.500 ft.).


B. macrophylla Var. Listeri Gage. Leaves smaller, 2-6 in. long; spikes densely fascicled in the axils.

DARRANG.

Ffrs. & Fr. Cold season.


A variable large spreading shrub; branches succulent, more or less strigose. Bark blackish; contains a pith-like substance inside. Leaves opposite, sometimes alternate. 2-6 by 1-2-4 in., broadly ovate, ovate-elliptic or suborbicular, acuminate, coarsely toothed, rather membranous, more or less scaberulous, 3-nerved; base rounded or cordate, often oblique; petiole 1-5-5 in. long. Flowers whitish, monœcious (sometimes dioecious). Male spikes usually branching from the lower axils. Female spikes from the upper axils, much
exceeding the leaves (type), pendulous. Fruiting perianth ellipsoid, sometimes angled.

LAKHIMPUR and K. & J. HILLS (4,000 ft.).

An exceedingly variable plant split up into many varieties in (F.B.I., V., 578).

Flrs. 6-8. Fr. Cold season to hot season.

**B. platyphylla** Don. Var. tomentosa Wedd. = B. tomentosa Wedd. is recorded from K. & J. Hills.


An undershrub; branches slender, glabrous. Leaves opposite, 4-8 by 8-1.8 in., lanceolate, acuminate, crenulate or serrulate, membranous, glabrous; 3-nerved; axils of the lateral nerves glandular; base acute or obtuse; petiole 3-2.5 in. long. Flowers clusters small, in slender spikes. Achene minute, ellipsoid, glabrous, crowned by the style nearly as long.

LAKHIMPUR and K. & J. HILLS (3,000 ft.).

Flrs. & Fr. 9-1.

7. **Boehmeria polystachya** Wedd.

A robust shrub; branches stout, glabrous. Leaves opposite, sometimes alternate, 5-12 by 2.5-6 in., broadly ovate, sub-orbicular, acuminate, coarsely dentate towards the apex, coriaceous, glabrous; 3-nerved; base cordate or rounded; petiole 5-2 in. long, stout. Spikes panicled, shorter than the leaves. Achene sessile, hispid, crowned by a short style.

MISHMI HILLS & KHASI HILLS (5,000 ft.).

Flrs. 7-8. Fr. 9-10.

**B. rugulosa** Wedd.

A small tree. Leaves 3-6 by 1.2 in., alternate, elliptic or elliptic-lanceolate, acute or bluntly acuminate, crenulate, glabrous, often rugose above, hoary-tomentose (finely) beneath; base rounded, 3-nerved; petiole 7-1.5 in. long; stipules connate. Dioecious spikes, axillary, drooping. Male spikes up to 5 in. long. Perianth hispid, hairy. Achene stipitate, ellipsoid.

NAGA HILLS.

Flrs. Rainy season. Fr. Cold season.
Chamabainia cuspidata *Wight.*

A slender shrub. *Leaves* opposite, 1-1.5 by 3-9 in., ovate, acute, toothed, membranous, glabrous or very sparsely pubescent; base usually rounded, 3-nerved; petiole 3 in. long; stipules orbicular in pairs. *Flowers* 4-merous; male in the upper axils; perianth lobes hairy, mucronate; female in clusters; perianth hirsute; stigma ovate, fimbriate, spreading. *Achene* compressed.

K. & J. HILLS (Elephant Falls).

Fhrs. 8.

7. **POUZOLZIA** Gauz

Herbs or shrubs. *Leaves* alternate or opposite, 3-nerved; uppermost sometimes passing into bracts. *Flowers* unisexual or androgynous, in axillary clusters. *Male flowers* perianth 4-5, very rarely 3, partite or lobed, dorsally gibbous or abruptly inflexed; pistillode clavate or oblong. *Female flowers* perianth tubular, 2-4-toothed; mouth contracted. *Fruiting perianth* angled or winged; style slender, articulate on the top of the ovary, deciduous. *Achene* crustaceous, albumen scanty or 0; cotyledons ovate.

Lobes of male perianth convex or gibbous dorsally; buds rounded:—


Lobes of male perianth abruptly inflexed about the middle and angled; buds truncate:—

Stamens 5. *Leaves* opposite. . . . . . 2. *P. hirta*.


A large shrub; branches slender, pubescent or strigose, *Bark* brownish-grey, rough, thin. *Leaves* alternate, 1-6.5 by 5-2 in., lanceolate, ovate-lanceolate or oblong-lanceolate, acuminate, dentate or serrate, membranous, dark-green, scaberulous and somewhat rough above, trigose on the nerves and pale grey beneath; 3-nerved; base obtuse or rounded; petiole 2-2.5 in. long. *Stamens* usually 4, inflexed in bud. *Achene* ovoid, angled, sparsely hispid towards the apex.

N. C. HILLS, GOALPARA, KAMRUP and K. & J. HILLS (5,500 ft.).
The leaves are eaten as vegetable and the bark yields a fibre for making coarse ropes.

Flrs. 11-3. Fr. 8-1.


Leaves elegantly veined and snowwhite or paler silky beneath.
N. E. F. TRACT, N. C. HILLS & DARRANG.

**P. indica** Gaud. Var. angustifolia is recorded from NOWGONG (Diphu Forests).

Flrs. 8.


A suberect or decumbent slender perennial almost woody plant with tuberous roots. *Leaves* opposite, 5-4 by 3-1 in., lanceolate or oblanceolate, acuminate, entire, membranous, hispid; usually strongly 3-nerved; base rounded or cordate; petiole 0-2 in. long. *Male flowers* in close clusters, 5-merous, globose, truncate, hairy above. *Fruit* variable, dull black when ripe, apetalous or 2-3-alate.

K. & J. HILLS 5,500 ft.
Roots are used as hair wash.

Flrs. 7-10. Fr. Cold season.


K. & J. HILLS (5,000 ft.). G. Mann.

Flrs. 7.

**P. Bennettiana** Wight.


KHASI HILLS (Dumpep) 5,000 ft.

Flrs. & Fr. 6-8.

**P. pentandia** Benn. is also recorded from KHASI HILLS & NAGA HILLS.

Flrs. 9.
Distemon indicum *Wedd.*


ASSAM (Jenkins).

Flrs. & Fr. 7-10.

8. SARCOCHLAMYS *Gaud.*


A small evergreen tree or large shrub; stem tubercled; branchlets pubescent. *Leaves* alternate, 3·5-8 by ·5-2 in., narrow lanceolate, toothed, caudate acuminate, rather membranous, rugose, shining and rough above, white beneath; strongly 3-nerved; basal nerves converging nearly to the apex; reticulations elegant and tesselate; base acute, obtuse or rounded; petiole ·5-3 in. long; stipules connate at base, intrapetiolar. *Flowers* dioecious; male clusters in slender rather interrupted axillary spikes; female clusters almost confluent in stouter spikes. *Male flowers* perianth sepaloid, connate, 5-partite; lobes imbricate; stamens 5; pistillode small. *Female flowers* perianth campanulate, constricted, 4-lobed. gibbous, accrescent in fruit. *Ovary* oblique; ovule erect; stigma small, sessile, penicellate. *Achene* oblique, enclosed in the fleshy perianth; pericarp membranous; testa hard; albumen 0; cotyledons ovate.

Common throughout the Province.
Young shoots and fruits are eaten as vegetables. Lac is also reared on this plant.

Flrs. & Fr. Cold season.

9. OREOCNIDE *Miq.*

Trees or shrubs. *Leaves* alternate; stipules intrapetiolar. *Flowers* usually dioecious, densely and capitately fascicled; fascicles cymose or panicled; bracts minute. *Male*
flowers perianth 4-5-partite; stamens exserted; pistillode present. Female flowers perianth tubular; minutely toothed, adnate to the ovary, somewhat fleshy in fruit; mouth narrowed; ovules erect; stigma sessile, discoid, penicillate. Achene crustaceous, closely invested by the perianth; testa thinly membranous; albumen distinct or scanty; cotyledon ovate or broad.

Leaf penninerved:—
Male flowers 3-4-merous. Leaves entire, somewhat obscurely crenate. .... 1. O. integrifolia.

Leaf-base 3-nerved:—
Male flowers 4-merous. Leaves distinctly serrate. .... 2. O. frutescens.


A small evergreen tree; young parts pubescent or tomentose. Bark greyish, warty with lenticels, ¹/₄ in. thick; blaze red, exuding water, green, fibrous. Leaves 4-14 by 1.5-4.5 in., elliptic-oblong, obovate-oblong, acuminate, usually entire, sometimes obscurely crenate. thinly chartaceous, pustular, sparsely puberulous above, pubescent beneath; lateral nerves 9-12 on either half; base obtuse; petiole 5-4 in. long (local; 1-6 in. in F.B.I.); stipule silky, hairy, deciduous. Flower heads dichotomously branched; cymose, hispid. Male flowers 3-4-merous; stigma papilose, ciliate; the bracts become succulent and glossy when the fruit ripens & it is seated on the cavity of the cup-shaped bract.

Occurs throughout the Province (4,500 ft.). Fibres utilised for making fishing nets.

Frls. 1-3. Fr. 10-11.


A large bushy shrub; bark dark-brownish on old stem;
branches slender, with whitish lenticels; young parts silky pubescent. *Leaves* 1-5 by 3-2 in., ovate or elliptic or oblong-lanceolate, acuminate, finely serrate or crenate, membranous, hispidly hairy and pubescent above, softly pubescent beneath and mottled whitish; 3-nerved at base, penninerved in the upper half; base obtuse, rounded or shallow-cordate; petiole 3·1·1 in. long; stipules up to 3 in. long. *Male flowers* perianth 4-partite; lobes valvate, lanceolate, woolly inside; stamens 4; pistillode glabrous. *Female flowers* perianth ovoid; stigma penicellate. *Fruit* aggregate of achenes, 3 in. across. contained in the somewhat fleshy perianth, orange when ripe, supported by the cup-shaped bract.

N. C. HILLS and K. & J. HILLS (4,500 ft.).
The bark yields a useful fibre.

Flrs. 4-5. Fr. 10-11.

10. **DEBREGEASIA** Gaud.

Shrubs or trees. *Leaves* alternate, serrate-crenate; 3-nerved at base; stipules intrapetiolar, connate. *Flowers* monoeious or dioecious, in compact panicked or spicate clusters (but not connate). *Male flowers* perianth sepaloid, 4-partite (rarely 3 or 5) valvate; stamens 4, (rarely 3 or 5): pistillode glabrous or woolly at base. *Female flowers* perianth ovoid or obovoid; mouth contracted and minutely toothed, succulent in fruit. *Ovary* straight, included; ovule erect; stigma sessile, penicellate. *Achene* at first adnate to the fleshy perianth; testa membranous; albumen copious or scanty; cotyledons short, broad.

Leaves narrow; petiole short (not exceeding 1 in.):—
Flower heads in dichotomous cymes:—
Leaves smooth above, ashy beneath. .. 1. *D. longifolia.*
Flower heads sessile or sub-sessile:—
Leaves scabrous above, white beneath. .. 2. *D. hypoleuca.*

Leaves broad; petiole long (exceeding 1 in.):—
Branchlets pubescent or scabrid:—
Leaves ashy-grey, tomentose beneath; lateral nerves to the midrib above basal up to 3 on either half. .. 3. *D. dentata.*
Branchlets glabrous or nearly so:—
Leaves white with closely adpressed tomentum beneath; lateral nerves to the midrib above basal into 5 on either half. .. 4. D. Wallichiana.


A large spreading shrub or small tree; young shoots silky-pubescent. Bark dark-brown, corky on old stem; blaze pink. Leaves 2-7 by 3-1.5 in., oblong-lanceolate or narrow-elliptic, oblong, acuminate, serrulate, subcoriaceous, rugose, scabrid and dark-green above, pale-white or ashy tomentose beneath; 3-nerved; lateral nerves from the midrib 2-3 on either half; base acute or rounded; petiole 3-1.2 in. long; stipules scarious, 2-fid., up to 3 in. long. Flowers in lateral dichotomous panicles. Male flowers bracteoles sub-orbicular; sepals exceeding the bracteoles; pistillode glabrous. Female flowers bracteoles narrower. Fruit an aggregate of achenes, in clusters, 3 in. across, contained in the fleshy perianth, orange yellow.

N. E. F. TRACT, GARO HILLS, NOWGONG, KAMRUP AND K. & J. HILLS (5,500 ft.).
The fruit is edible. The fibre obtained from this plant is of superior quality and is used for cordage.

Flrs. Rainy & Autumn season. Fr. Cold season.

2. Debregeasia hypoleuca Wedd.
A large evergreen shrub. Bark blackish-grey, warty; inside fibrous, light cinnamon; branchlets clothed with snow-white wool. Leaves alternate, 3-6 by 5-1.2 in., oblong or linear-lanceolate, acuminate, serrulate, rather coriaceous, scabrous and raised dotted above, thickly white pitted beneath; 3-basal nerved; lateral nerves to the midrib 3-5 on either half; petiole 3-1 in. long. Male flowers sepals shorter than the bracteoles. Fruit an aggregate of amber coloured achenes, in clusters, sweet but insipid and mucilaginous, 3 in. across, succulent.

KAMRUP (Kanjilal).
The ripe fruit is edible. The fibre is made into rope or twine.

Flrs. 4-5. Fr. 6-8.

A much branched bushy shrub, about 10 ft. high; stem brownish-green, warty; branchlets pubescent or scabrid. *Leaves* 3-7 by 1-4 in., orbicular-ovate or elliptic-ovate, cuspitate, dentate, acute or acuminate, membranous, scabrid above, ashy tomentose beneath; 3-basal nerved; lateral nerves to the midrib above the basal 2-4 on either half: base rounded or obtuse; petiole 1-5 in. long, slender. *Female heads* in short sessile dichotomous cymes with slender ramification. *Fruit* an aggregate, in clusters, reddish-brown, 15-2 in. across.

**SIBSAGAR & CACHAR.**

Flrs. 10-12. Fr. 1.


A small tree, often epiphytic, with an umbrella like spreading crown; young parts pubescent or tomentose. *Leaves* 2-12 by 2-9 in., orbicular or broadly ovate, cuspidate or acuminate, entire or sinuate-serrate, coriaceous, glabrous above, white with dense adpressed tomentum beneath; base 3-nerved; lateral nerves to the midrib above the base 3-6 on either half, very prominent; base rounded, shallow cordate; petiole 2-10 in. long, stout. *Flowers* in dichotomous cymes; peduncles 2-3 in. long. *Male flowers* sepal exceeding the bracteoles. *Fruit* an aggregate of achenes, in succulent clusters, 2-25 in. across, pinkish.

**GARO HILLS and K. & J. HILLS** (5,000 ft.).

Flrs. 6. Fr. 9-10.

11. **MAOUTIA** *Wedd.*

**Maoutia Puya** *Wedd.* *Vern.* Ja-khi, Bad-langmyrsau, Khasi.

A shrub; bark purplish-grey with vertical lines of brown lenticels; young parts hairy. *Leaves* alternate, 2-2.7
by 1·1-2·7 in., elliptic, obovate-elliptic, cordate, acuminate, coarsely dentate or crenate, membranous, scabrid above, white felted beneath; 3-nerved; base rounded or obtuse; petiole 5-3·5 in. long, slender, pubescent; stipules connate, 2-fid. Flowers minute, monœcious or dioecious, in small cymose globose heads dichotomously panicled (sometimes androgynous). Male flowers sepal 5, valvate; stamens 5, inflexed in bud; pistillode woolly. Female flowers perianth 0. Ovary straight; stigma penicillate; ovules erect. Achene very small, about 0·05 in. long, ovoid, hispid, with a fleshy pericarp, triquetrous.

N. E. F. TRACT and K. & J. HILLS (4,600 ft.).
A fine white strong fibre is obtained from the plant which is useful in making fishing nets, twine, etc.

Flrs. 6-7. Fr. 10-11.

FAM. 127. JUGLANDACEÆ.

Trees, rarely shrubs, often strongly aromatic. Leaves alternate, pinnate, exstipulate. Flowers monœcious; the male flowers appearing as catkin in the twigs of the previous year; the female as sessile flowers on the stem of the current year, sub-solitary or spicate. Perianth 0 or rudimentary. Stamens 3-40 (more in the lower flowers); anthers 2 or more, nearly sessile. Perianth epigynous in female flower. Ovary 1-celled; ovules 1, erect, orthotropous; style short; stigma 2. Fruit drupe or nut. Seeds exalbuminous; cotyledons oily, lobed, contorted or corrugated; radicle superior.

Female flowers solitary (2-3) :
   Bracts not enlarged in fruit (drupes) .. 1. Juglans.
Female flowers spicate :
   Bracts produced into a wing in fruit (Nut) .. 2. Engelhardtia.
1. JUGLANS Linn.


A large aromatic deciduous tree; shoots velvety. Bark grey, longitudinally fissured. Leaves imparipinnate, 6-15 in. long, thickly tomentose when young. Leaflets 5-13, sub-sessile, opposite or sub-opposite, 3-8 by 2-4 in., elliptico-oblung, often oblique, usually entire, acute or acuminate, coriaceous, pubescent along the nerves beneath or with tuft of hairs at the axils of the nerves; lateral nerves 15-20 on either half; base rounded or obtuse. Male catkins green, 2-5 in. long, often in pairs; bracts stalked, oblong, lobed. Stamens 10-20 or more. Female flowers 1-3. Calyx obscurely 4-toothed. Petals 4, green. Stigma more or less fleshy. Fruit 2 in. long, ovoid, glabrous or pubescent, green, with yellow dots; pericarp leathery, aromatic; shell 1-1.5 in. long, 2-valved; cotyledons irregularly corrugated.

MISHMI HILLS (5,000 ft.) & AKA HILLS (N. L. Bor). Cultivated in Shillong (K. & J. Hills).

The fruit is the well-known walnut of commerce. Bark is used as a dye and also medicinally as an anthelmintic and detergent. The leaves are astringent and tonic.

Timber is very valuable, weight 40-50 lbs. per c. ft. Heartwood greyish-brown with darker streaks, mottled; seasons and polishes well and has a great demand for gun-stock and ornamental furniture.

Ffr. 2-4. Fr. 7-8.

2. ENGELHARDTIA Leschen.

Trees or shrubs. Leave pinnate; leaflets entire or serrate, usually glandular, punctate beneath; stipules 0. Flowers monœcious. Male flowers in slender simple or bracteate erect or pendulous lateral spikes; perianth connate with simple lobed or laciniate usually very unequal bracts or scales, sometimes irregularly 4-lobed, resembling calyx; stamens 4-12, sub-sessile on the scales. Female flowers in pendulous spikes; perianth adnate to ovary, solitary, sessile on a 3-4 lobed bract; limb 4-lobed or toothed; stigmas 2, short, sessile or long, laciniate. Fruit a small globose nut, adnate to the much enlarged, scarious, 3-lobed, reticulately nerves bract with mid-
lobe exceeding the lateral; epicarp or calyx thin, glandular-hirsute; endocarp 2-valved.


Nuts villous:—
Leaflets sub-opposite petiolulate, pubescent.
2-8 in. long, ultimately:—
Middle bracts upto 3 in. long:—
Female spike 6-13 in. long:—
Leaflets 6-13, petiolulate, pubescent, sub-opposite, 1-5-6 in. long, terminal often absent; nerves beneath densely tomentose:—
Middle bracts upto 1-9 in. long:—
Female spike 4-6 in. long.
Nuts hispidly hirsute; leaflets sessile. 5-7 in. long; nerves beneath tomentose.
1. E. spicata.

Nuts glabrous:—
Male flowers in terminal spikes:—
Leaflets elliptic or oblong:—
Exocarp glabrous.
Male flowers in panicked spikes:—
Leaflets sub-falcately lanceolate or elliptic:—
Exocarp clothed with golden scale.
2. E. Colebrookiana.

3. E. acerifolia.

4. E. polystachya.

5. E. Wallichiana.


A large deciduous tree (100'/224") often gregarious; base often buttressed. Bark grey or greyish-brown, rather rough, vertically split, exfoliating in small flakes about 1 in. broad, ·7 in. thick, fibrous; inside light or deep red, with rather broad and irregular streaks of lighter tissue; branches lenticellate. Leaflets 4-13. sub-opposite, 2-8 by 1-2·2 in., narrow-oblong, oblong-lanceolate or elliptic-lanceolate, acute or obtuse, nearly entire, rather sub-coriaceous, glabrescent above, pubescent beneath, ultimately glabrate, clothed with orbicular glands; lateral nerves 8-13 on either half; base very unequal; petiolue ·05·3 in. long. Male flowers in
slender catkins, 2-8 in. long, often panicled. *Female flowers* in pendulous spikes, 6-13 in. long; middle bract in fruit 2-3 in. long. *Nut* globose, •2•• 3 in. across, villously hispid.

LAKHIMPUR, SIBSAGAR, NOWGONG, DARRANG, KAMRUP, GARO HILLS, GOALPARA, CACHAR, N. C. HILLS, SYLHET, K. & J. HILLS & AKA HILLS, (upto 5,000 ft.).

Wood cream-coloured or reddish grey, moderately hard with a silvery lustre on radial section. The timber is useful, used for tea and packing boxes, suitable for curving.

Lac is raised on this tree by Garos. Bark is also used to intoxicate and kill fish.

Flrs. 11-12. Fr. 3-4.


A small deciduous tree, often with spreading crown, sometimes gregarious. *Bark* brown, rough, •5 in. thick; inside fibrous, light red, with faint distant streaks of whitish tissues. *Leaflets* 6-13, the terminal usually smallest, often absent; the laterals sub-opposite, 1•5-6 by 1•3 in., oblong, obovate or elliptic-oblong, rounded or bluntly acuminate, entire, sub-coriaceous, glabrescent above, densely tomentose beneath; lateral nerves 9-12 on either half; base conspicuously unequal-sided; petiolue •05•• 2 in. long. *Male flowers* in cylindrical lateral catkins or rarely at the lower half of female spikes. *Female flowers* in pendulous spikes. *Nut* •2•• 3 in., globose, villously hirsute; middle bract of fruit 1•1•• 25 in. long.

DARRANG, KAMRUP, GARO HILLS AND K. & J. HILLS, (upto 3,000 ft.).

Wood greyish, moderately hard, even grained with very fine wavy interrupted concentric lines, with a satiny silver grain on radial section (Gamble).

The leaves are cattle fodder.

Flrs. 2. Fr. 4-5.

3. **Engelhardtia acerifolia** Blume.

A large deciduous tree. *Leaflets* 5-7 in., sessile or sub-sessile, linear-oblong, entire or serrate; petiole and nerves beneath tomentose. *Nut* hispidly hirsute.

A middle sized or large tree (upto 100'70''); stem fluted. Bark dark-brown, roughly and longitudinally fissured; inside fibrous, light yellow at first but soon turning deep amber yellow. Leaves usually paripinnate, red when young. Leaflets 2-8 by 1-3 in., usually opposite, elliptic or oblong, acute or obtuse, coriaceous, glabrous above, clothed with golden peltate glands beneath; lateral nerves 8-10 on either half, sub-parallel; base unequal; petiolule 0'5-5 in. long. Male flowers in slender terminal spikes, often fasciculate; bracts membranous, middle one in fruit up to 1'9 in. Nut glabrous, 1'-15 in. across.

LAKHIMPUR, SIBSAGAR, DARRANG, GARO HILLS, CACHAR, SYLHET, N. C. HILLS and K. & J. HILLS, (upto 4,000 ft.).

Bark is used to intoxicate and kill fish.

Flrs. 2-5. Fr. 10.


A glabrous tree. Leaves paripinnate; petiole 3-4 in. long. Leaflets 2-4 pairs, 3-6 by 1-5 in., falcately lanceolate or elliptic, entire, sub-coriaceous, glabrous; base somewhat oblique, lateral nerves 8-9 on either side (with shorter and finer intermediate ones also); petiolule 2-3 in. long. Male flowers in sub-erect panicled spikes; stamens about 12; anthers didymous. Female flowers perianth 4-lobed, ovary globose; stigmas 4. Nut globose, 1'5 in. across, clothed with small golden scales, crowned with the persistent perianth segments. Fruiting spike 6-9 in. long; middle bract (winged) upto 1'9 in. long.


Flrs. 7.
FAM. 128. MYRICACEÆ.

Aromatic trees or shrubs, monœcious or dioecious. *Leaves* alternate, simple, exstipulate. *Flowers* in simple rarely compound bracteate spikes, achlamydeous. *Stamens* 2-16, usually 4 on a torus adnate to the bract; filaments free or connate at the base. *Ovary* 1-celled; ovule 1, basal, orthotropous; stigma 2-fid. *Drupe* ovoid or globose, resinous, succulent or waxy; endocarp hairy. *Seed* exalbuminous; embryo straight; cotyledons plano-convex; radicle superior.

**MYRICA** Linn.


A small or moderate sized evergreen tree (40'/40''). *Bark* greyish-brown, rough, vertically wrinkled, finely fibrous, .3 in. thick, reddish-brown; inside mottled with yellow streaks; extremities pubescent. *Leaves* 2-6 by .5-1.5 in., lanceolate, oblanceolate or obovate, nearly entire or sharply spinous-serrate, obtuse or acute, coriaceous, glabrous above, with resinous dots beneath; lateral nerves 12-20 on either half, anastomising at the ends to form a marginal vein; base acute; petiole .2-.6 in. long. *Male spikes* sometimes with female flowers at the top. *Fruit* about 1 in. long, ellipsoid or ovoid, tubercled, reddish or cheese coloured when ripe.

SIBSAGAR (Dikho Valley), NAGA HILLS and K. & J. HILLS, (upto 6,000 ft.).

The ripe fruits are edible and make a very refreshing drink in the hot weather.

The bark is used as an aromatic stimulant and externally as a plaster for rheumatism. It has other medicinal properties e.g., resolvent, astringent and carminative; also cures catarrh and headache. It is one of the best of Indian bark dyes, the colour produced being yellow (Gamble). It is also used to poison fish.

Flrs. 10-12. Fr. 4-6.
M. sapida Wall. Synonymous with M. Farquhariana Wall. (F.B.I., p. 597). There is however some marked difference in the extreme forms in the leaves and fruits, but there are intermediate forms in the local collections where these differences merge.

Flrs. 10-11. Fr. 3-4.

FAM. 128a. CASUARINACEÆ.

CASUARINA Forst.
(Only one genus).

Vern. Bilati-jhau, Beng.

A large handsome tree; branchlets drooping, sulcate, jointed, grooved, cylindric; internodes ending in a sheath of 6-8 scale-like leaves. Male flowers in terminal spikes, numerous at the ends of the same branches at which the females are borne; bracts subulate, pubescent on the margin; perianth concave, circumsciss at base; stamen 1, inflexed in bud; anthers large. Female flowers in ovoid ellipsoid or globose heads which are tomentose; bracts subulate, externally erect, with a broad horizontal base internally which is lignified in the fruit, the remaining portion of the bract remaining unaltered; bracteoles ultimately about 0.25 in. long, valvately closed till the seed is ripe; stigma filiform, bifid almost to the base; ovules 2, collateral. Fruit resembling a cone formed of the enlarged bracts and bracteoles, 0.5-0.75 in. long. Seeds with wing 0.18 in. long.

GOALPARA (Dhubri) & LAKHIMPUR (Dibrugarh). Cultivated.

Flrs. Hot season. Fr. 7 onwards.

I agree with Mr. Haines and also find the specimen in the local herbarium monoecious (F.B.I.; V., p. 598).
FAM. 129. FAGACEÆ.

Deciduous or evergreen trees, rarely shrubs. Leaves alternate, penninerved, generally serrate. Flowers monœcious. Male flowers in pendulous catkins; perianth campanulate, 4-8 cleft or partite; stamens as many or twice as many as the perianth segments; pistillode rudimentary or obsolete. Female flowers solitary in each involucre; perianth tube adnate to the ovary; limb minutely toothed; staminodes minute or obsolete. Fruit (acorn) a one seeded nut seated on a cup (cupule) formed by the coalescence of numerous enlarged and hardened bracts or scale; cotyledons thick, fleshy, hypogeal. “Pith in most species pentagonal, the angles often projecting. Medullary rays of 2 classes, very broad and narrow. Some species have uniformly very fine rays numerous and equidistant”. Wavy soft, more or less concentric bands of wood-parenchyma (often very narrow) in most species. Wood fibres with bordered pits.

1. QUERCUS Linn.

Monœcious, deciduous or evergreen trees, rarely shrubs. Leaves alternate, penninerved. Flowers small or minute, bracteolate; male flowers usually in drooping spikes or panicles; female flowers in erect unisexual or androgynous spikes. Male flowers perianth segments usually 6; stamens
6; pistillode hairy or obsolete. Female flowers solitary or in clusters each enclosed in an involucre or imbricate scales; perianth adnate to the ovary; limb minutely toothed. Ovary inferior after fecundation, more or less completely 3-celled (rarely more) with 2 ovules in each cell; stigma broad, covering the inner surface of the styles or cupulate. Nut (usually called an acorn) 1-celled, ovoid globose or turbinate, surrounded by the accrescent cupuliform hardened involucre. Seeds 1 or 2; cotyledons thick, fleshy, planoconvex; radicle minute.

I. Male spikes simple, slender, lax, pendulous; involucre of fruit usually in short spikes, cup-shaped. Bracts imbricate; apices free. Leaves dentate or lobed:—
- Mature leaves hairy or tomentose beneath:
  - Glans globose; leaves entire or spinescent, dentate.
  - Glans elongate, ovoid; leaves coarsely dentate-serrate.
- Mature leaves glabrous:
  - Acorn sub-globular; Leaves setaceous, serrate.

II. Male spikes as in I. Involucre forming a cupule, the bracts connate into concentric laminae or zones; edges entire, crenate or denticulate. Leaves serrate or dentate:
- Glans ovoid or ovoid-cylindric, exserted, less than half enclosed in the cup:
  - Leaves lanceolate, coriaceous:
    - Glans ovoid nearly 2 in. long.
    - Glans ovoid less than 1 in. long.
  - Glans globose:
    - Leaves thinly chartaceous, entire or sub-repand towards the apex.

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Glans turbinate, almost enclosed by the large lamellate cupule. . . . . . . 9. Q. lamellosa.

III. Male spikes erect, stiff. Bracts connate into entire or denticulate lamellæ. Leaves entire, finely stellately hairy underneath:—

Nuts depressed, grey, velvety. . . 10. Q. Thomsonii.

IV. Male spikes erect, stiff. Involucre ovoid or globose, enclosing the whole nut, marked on the outside with concentric belts or densely clothed with acuminate scales. Tips sometimes free. Leaves quite entire:—

Involucre with concentric belts and a few scales or tubercles:—

Glans silky, glabrous, rugose. Apex not free. . . . . . . . . . . . 11. Q. lanceæfolia.

Glans depressed-globose, polished. Apex free. . . . . . . 12. Q. 0lla.


Usually a large or middle-sized tree (in Assam, shrubby or a small tree). Bark dark ashy-grey, cracked into more or less 4-sided scales; inside reddish, coarsely granular; young parts softly ferruginous tomentose. Leaves 1.2-5 by .5-1.3 in., elliptic or oblong, very spinous on young plants and more or less entire on mature ones (intermediate between Q. dilatata and Q. semecarpifolia) usually obtuse, coriaceous, glabrescent above, stellate pubescent beneath; lateral nerves 8-10 on either half, horizontal near the base, bifurcating about half way up, quite strong beneath, depressed above; base cordate; petiole .1-.12 in. long. Male spikes crowded, 2-6 in. long; perianth segments obtuse, ciliate. Female inflorescence few-fld, in axillary peduncles; style recurved; Acorns usually solitary on previous year’s shoot, globose, black when ripe, 1 in. across; cupule enclosing about a third of the glan, small, thin; scales ovate, acute.

K. & J. HILLS. (4,200 ft.).

Heartwood reddish-grey, hard, close grained. Annual rings not very distinct. A few broad medullary rays with numerous very fine ones between. Weight 53 lbs. per c.ft.; good fuel, also used for
building purposes. “Silver grain not conspicuous but characteristic.” (Gamble).

The Assam form is slightly variable but the bifurcation of the main nerves half way up only is a definite diagnostic character.

Flrs. 5. Fr. 8-9. 15 months after flowering (U. N. Kanjilal).


A large, or small deciduous tree; young parts usually rusty-pubescent. Bark warty, dark ashy-grey, deeply furrowed; blaze reddish, fibrous. Leaves 4-9 by 2-5 in., obovate, obovate-oblong or oblanceolate, acute or sub-acuminate, more or less coarsely dentate, serrate, usually entire towards the base, coriaceous, glabrous above when mature, softly rusty pubescent beneath when young, yellowish-grey pubescent when mature; lateral nerves 12-17 on either half, almost parallel, terminating in the denticulation, conspicuous; base subcordate, rounded or cuneate; petiole 1-4 in. long, pubescent; stipules linear, hairy, fugacious. Male spikes fascicled at the base of the young shoots, subpendulous. Perianth segments 5-6, hairy. Stamens 8-12; anthers hairy. Acorns almost sessile, in clusters of 2-5 at the end of branchlets; cupule hemispherical, 3 in. deep, about 5 in. across, slightly sericeous outside, smooth inside; scales ovate, rather acute, adpressed, narrow towards the upper end. Glans ovoid, smooth, 5-6 in. long; style base persistent.

KHASI HILLS & NAGA HILLS, 4-6.000 ft.

Wood very hard, brown. The timber is used for building and other purposes locally.

Male Flrs. 6. Young Fr. 7.

**Var. oblonga** King.—Leaves oblong, slightly obovate, shortly acuminate, sub-entire or slightly dentate; undersurface puberulous or subglabrous, not pale.

NAGA HILLS (C. B. Clarke) & KHASI HILLS (Mann).

3. **Quercus serrata** Thunb. Var. Roxburghii A.D.C.

A middle-sized or large deciduous tree (60'/60''), straight stemmed; young parts softly pubescent. Bark dark-grey. 75 in. thick, split both vertically and horizontally; inside brown, granular. Leaves 3-8 by 1-3 in., lanceolate,
oblong-lanceolate or elliptic-lanceolate, acute or acuminate, serrate, thinly coriaceous, glabrous and shining when mature; hairy along the midrib beneath; lateral nerves 10-20 on either half, prominent, almost parallel, each nerve terminating in a serrature and forming the setæ; base rather rounded; petiole 5-1.5 in. long; stipules oblong. **Male spikes** elongated, rachis tomentose; anthers glabrous; stamens about 10. **Female flowers** on short axillary spikes; style filiform. **Acorns** solitary or in pairs, almost sessile on the previous year’s shoot; cupule woody, hard, embracing 3/4 of the ripe glan; scales much imbricate, numerous, ovate-lanceolate, spreading, hoary, with serrate vertical ridges outside, the lower rows much reflexed. **Glans** bitter (not eaten), sub-globose, apiculate, smooth when ripe, 7.5-1 in. across.

**KHASI HILLS.** 2,500-5,500 ft. **N. C. HILLS, NAGA HILLS & MANIPUR, (upto 5,500 ft.).**

Wood dark greyish-brown with large pores in spring wood: “Concentric bands of wood parenchyma obscure” (Brandis). Medullary rays of 2 kinds, broad compact rays alternating with many very numerous and fine ones. Broad rays show a conspicuous silver grain on radial section; weight 58 lbs. per c. ft. (Gamble).

Fuel; timber is used for building purposes also.

Flrs. 6. Fr. (Mature) 1-2.

4. **Quercus semiserrata** Roxb. Vern. **Sehop, Lushai; Phakhoh, Kuki; Suchhi-arong, Mik.; Sekho, Tipp.; Ramrola, Cach.**

A large or middle-sized evergreen tree (100'/60''); young shoots softly fulvous-tomentose. **Bark** grey, rough, hard, 5 in. thick; inside dark-brown, with distant yellowish streaks; old stem very irregularly buttressed, furrowed and fluted. **Leaves** 3-8 by 1-3 in., oblanceolate, oblong or elliptic-lanceolate, acute or shortly acuminate, coarsely serrate or semi-serrate towards the apex, coriaceous, glabrous above, glaucous or glaucescent beneath; lateral nerves 10-14 on either half, straight, prominent beneath; base obtuse or cuneate, often unequal sided; petiole 5-1 in. long. **Male spikes** solitary, axillary, 2-3 fld. **Styles** long, bifurcated; stigma sub-capitate. **Cupule** annulate, hermispheric, 6 by 9 in. covering about 2/5 of the glan; the lamellæ
4-6, velvety-tomentose outside, smooth, purplish inside. *Glans* (mature) cylindric, ovoid, 1·25-1·5 by .75 in., canescent with an annulate conical beak .2 in. long.

**CACHAR, SYLHET, N. C. HILLS, KHASI HILLS, GARO HILLS & MANIPUR** (upto 4,000 ft.).

Heartwood hard, reddish-brown. Medullary rays fine without any broad ones.

**Fr. 11-3.**

**Var. Mannii.** Vern. Phong-rong-long-poh, Mik. A large tree 6'-8' in girth. *Bark* whitish, .3 in. thick; blaze brown; wood hard. *Leaves* 4-6 in. long, narrowed at the base; nerves about 14 on either side. *Cupule* with thick everted mouth, villously tomentose.

**LAKHIMPUR, SIBSAGAR & KHASI HILLS.**

**Fr. 1.**

5. **Quercus glauca** Thunb. Vern. Dieng-syrtap, Dieng-rih, Khasi; Dieng-sari-war, Synt.

A large evergreen tree. *Bark* blackish-grey, granular, warty, .13 in. thick; blaze brown, with white vertical lines. *Leaves* 2-5·5 by .5-2 in., oblong-lanceolate to ovate-lanceolate, rather caudate-acuminate, more or less sharply serrate half way towards the apex, coriaceous, glabrous above, glaucous beneath or sometimes finely pubescent; lateral nerves 10-14 on either half, prominent beneath; base acute or obtuse; petiole .4-.8 in. long, slender. *Male spikes* axillary, solitary or panicled; bracts early deciduous; perianth segments 4-5; stamens 4-5. *Female spikes* axillary, solitary 2-5-flowered; styles 3. *Cupule* sessile, hemispheric, annulate, grey tomentose, .3-.5 in. in diameter, the lower lamellae crenate or denticulate. *Glans* much exerted, ovoid, shining, apiculate.

**KHASI HILLS,** (4-5,000 ft.).

Wood hard, but is very little used. Weight about 58 lbs. per c.ft.

**Frs. 3-5. Fr. Cold season.**

6. **Quercus patkoiensis** A. Camus.

A tall tree; *branches* almost tomentose. *Leaves* 5-6·3 in. long, 1·5-2·2 in., broad, assymetric, lanceolate or ovate-
lanceolate, acuminate, entire or sinuate, glabrous above, pilose beneath; lateral nerves 9 on either half; base attenuate; petiole tomentose, 7-1 in. long. Cupule sub-hemispheric, 1-1·3 in. broad, 4·6 long, 9 zonate. Glans ovoid or sub-ellipsoid, with a truncate base (apex mucronate), 1·5 in. long, 1-1·2 in. in diameter.

PATKOI MOUNTAINS, ASSAM. (R. S. Hole 22).
(Bulletin De la Socite Botanique De France LXXX 1933 p. 353).


A small or middle-size tree. Bark grey, rather plain; inside slightly fibrous, deep pinkish, 4 in. thick. Leaves 2·5-4·5 by 1-1·6 in., lanceolate to ovate or oblong-lanceolate, thinly coriaceous, acuminate, glabrous and shining above, glaucous or minutely pubescent beneath; lateral nerves 13-16 on either half; base acute, obtuse or rounded; petiole 4-6 in. long. Male spikes in small fascicles; perianth segments 4; stamens 4. Female spikes on different trees, solitary, axillary. Few flowered; stigma sub-capitate. Cupule sessile when young; ripe cupule cup-shaped or saucer-shaped. Ripe glans hemispheric, more or less depressed; base truncate.

According to King (Annals Royal Botanic Garden, Calcutta II 32-33). Q. lineata (type) with entire leaves does not occur in India. The following varieties are recorded.

Var. oxydon:—Leaves oblong-lanceolate, strongly spinose, serrate (except at the base) glaucous beneath; ripe cupules hemispheric; lamellae about 7. Glans hemispheric; base truncate, smooth.

KHASI HILLS & NAGA HILLS, (3-5,000 ft.).

Fr. 7-9.

Var. Lobbi:—Young branches, young cupule and under side of leaves minutely tomentose.

Var. Griffithii:—Leaves sub-entire, much acuminate.

KHASI HILLS, (3,000 ft.).

Fr. 8-10.

8. Quercus Helferiana A. D C.

A small tree; young parts rusty-tomentose. Leaves 5-7 by 2-3, elliptic or ovate-lanceolate, acute or sub-obtuse, serrate
towards the apex, shining above except the midrib and the nerves which are laxly sericeous when young, densely tomentose beneath; lateral nerves 9-12 on either half, prominent beneath; petioles stout ·5·75 in. long. Cupule thick, flat, patelliform. Glans turbinate, hemispheric, apiculate, base truncate, ·75 in. across and ·4 in. long, minutely lepidote, tomentose.

MANIPUR, (2,500-3,000 ft.).  

Flrs. 2. Ripe fruit 8-10.


A magnificent tree; young part fulvous-tomentose. Leaves 7-9 by 2.5-4·5 in., oblong or elliptic, acute or acuminate, remotely and sharply serrate towards the apex, coriaceous, glabrous above, glaucous beneath except the nerves, which are pulvinous (when young); lateral nerves 10-20 on either half; base acute, rarely obtuse; petiole 1·25-1.75 in. long. Male spikes solitary, axillary, shorter than the leaves. Female spikes very short, axillary, 3-4 flowered. Cupules very large, embracing 2/3 of the glan. Glans turbinate when ripe, apiculate, 1·5 in across and 1·25 in. long.

NAGA HILLS & DUFFLA HILLS, (5,000-8,000 ft.).  


10. Quercus Thomsoni Miq.

A large tree 80-100 ft. high; young parts deciduously puberulous. Leaves 2·5-6 by 1·2 in., oblong-lanceolate, acuminate, entire, glabrous or slightly glabrescent above, glabrescent and pale beneath; lateral nerves 10-13 on either half; base narrowed; petiole ·3·6 in. long. Spikes terminal, solitary or fascicled, mostly androgynous. Male flowers-perianth segments 6; stamens 12. Female flowers in clusters of 3, sessile; styles 3, spreading. Cupule woody, saucer-shaped. ·5·7 in. across, enclosing only the base of the glan; scales pubescent, connate, tips free. Glans globose or pyriform, grey tomentose, crowned with remains of the style,
mature 4–65 in. across. **Ripe fruit** solitary (by abortion), often crowded on a stout rachis.

KHASI HILLS, (2,000-5,000 ft.). Also Patko's Range—R. N. De.

Frs. Hot season. Ripe fruit 7.


An evergreen tree (60'/60''). **Bark** greyish-brown with close fissures and cracks, 16 in. thick; inside reddish-brown, fibrous, with streaks of lighter tissue. **Leaves** 1·5-5 by 1·2 in., lanceolate or oblong-lanceolate, abruptly acuminate, entire, thinly coriaceous, smooth and shining above, with metallic lustre underneath; lateral nerves 9-11 on either half (rarely up to 16 ?), prominent, arcuate; base-acute or rounded; petiole 4·7 in. long. **Spikes** in large terminal tomentose panicles (some androgynous). **Male flowers** puberulous, solitary; perianth segment 6; stamens 12. **Female flowers** in panicles or few near the apex of the spikes. **Cupules** completely enclosing the glans, splitting up irregularly setting free the glans, ovoid, crustaceous, marked with 4-6 ridges which are entire or denticulate; styles united penetrating the apex of the glans. **Glans** glabrous, rugose, about 1 by 5 in.; base of ripe fruit often oblique.

GOALPARA and K. & J. HILLS, (upto 5,000 ft.).

Wood cream-coloured, hard, with numerous fine equidistant medullary rays and very few broad ones; used for building purposes.

Frs. Cold season. Ripe fruit following cold season.


KHASI HILLS (G. Mann).

12. *Quercus Olla* Kurz.

**Bark** dark coloured, smooth. **Fruit** spikes stout, about 4 in. long. **Cupules** distinct with 1 or 2 abortive ones adnate to the base, subturbinate, 1 in. in diameter and 5 in. thick, thick walled, woody, minutely tomentose; scales numerous,
broad, abruptly acuminate, in regular vertical rows. Glans depressed globose, polished; the apex free.

ASSAM (Jenkins). (No specimen in Forest Herbarium, Shillong).

**Quercus Engleriana** Seem.

A large tall evergreen tree with unbranch ed trunk and big spreading crown.

Delei Valley, ASSAM. 6,000-8,000 ft. (K. Ward 8053 and 8305). (No specimen in Forest Herbarium, Shillong).

2. **PASANIA** Oerst.

Oaks. Leaves entire. Male spikes erect, simple or pani cled. Female flowers in short distinct spikes or at the base of some of the male panicles. Stamens 12. Stigma a terminal pore on the slight curved styles. Acorn ovoid or globose, sometimes entirely enclosed in the cup; umbo is only visible. Cup with imbricate separate scales or combined in rings of ten reduced to mere lines. Seed 1.

I. Male spikes stout, erect, simple or pani cled; females on short distinct spikes or at the base of male spikes; involucre solitary or in groups of 3; cups hemispheric or ovoid; bracts imbricate. Leaves entire:

- Half or less of the mature nut enclosed by the cupule:
  - Leaves quite glabrous on both surfaces:
    - Glans ovoid, conic:
      - Leaves lanceolate or oblanceolate. ...
    - Glans sub-orbicular:
      - Leaves ovate-lanceolate. ...
  - Leaves tomentose or pubescent beneath:
    - Nut ovoid, conic, velvety. ...

More than half of the mature nut enclosed by the cupule:

- Glans hemispheric:
  - Cupules always connate. Leaves lanceolate. ...
  - Cupules crowded, connate or solitary:
    - Leaves glabrous, caudate; nut glabrous. ...

2. **P. spicata.**

3. **P. polystachya.**

4. **P. pachyphylka.**

5. **P. lappacea.**

6. **P. jenestrata.**
Leaves minutely pubescent (not caudate); nut hoary. .. 6. P dealbata.

II. Male spikes erect, stiff; involucre ovoid or globose enclosing the whole nut, marked on the outside with concentric belts or densely clothed with acuminate scales. Tips sometimes free. Leaves quite entire:—

Cupules tuberculate:—

Glans entirely covered by the involucre. .. .. .. 7. P. xylocarpa.

Glans apex not covered by the involucre. .. .. .. 8. P. truncata.


A large or middle-sized tree (150' high); young shoots sometimes hairy. Bark grey, plain, 3 in. thick; blaze red with white vertical lines, turning deep-brown; cambium reticulated. Leaves 3-10 by 1-4 in., very variable, elliptic-oblong to obovate-oblong, sub-acute or bluntly acuminate, entire, coriaceous, shining, glabrous; lateral nerves 11-15 on either half; base acute, rounded or occasionally slightly cordate; petiole 2-8 in. long. Male spikes usually in dense minutely tomentose terminal panicles or fascicles, a few being male flowers. Male flowers bracteolate; perianth-segments 6; stamens 10-12. Female flowers distinct or in glomerule of 3. Ripe fruit more or less confluent on a stout rachis. Cupules solitary or connate (2-3) saucer-shaped, enclosing only the lower portion of the glans, 7-8 in. across; scales connate, slightly pubescent. Glans ovoid, conic, smooth, shining, often depressed.

K. & J. HILLS, SIBSAGAR, GARO HILLS, NAGA HILLS & KAMRUP, (upto 6,000 ft.).
Wood very hard, red; annual rings inconspicuous. Medullary rays broad and very fine, uniform and equidistant; silver grain conspicuous on radial section. Used for building, fuel and charcoal.

Flrs. 4-5. Fr. 3-10.
The following more or less stable varieties are recorded from Assam.


   Petiole short. *Leaves* more or less obovate; base often slightly cordate. *Acorns* quite large, up to 1.5 in. in diameter.
   
   KHASI HILLS.
   
   Flrs. 4. Fr. 8-9.

2. **Var. gracilipes** Miquel.

   Leaves lanceolate; base acute; petiole large (upto 0.9 in.). *Glans* not conical.
   
   KHASI HILLS.

3. **Var. microcalyx** Blume.

   Leaves small. *Acorns* small (under 0.5 in. in diameter). *Glans* with conical apex.
   
   KHASI HILLS & CARO HILLS.
   
   Flrs. 8. Fr. 12.


   *Leaves* lanceolate or oblanceolate; acute or acuminate. *Acorns* solitary. *Glans* ovoid, apiculate.
   
   KHASI HILLS.
   
   Flrs. 8. Fr. 12.

2. **Pasania polystachya** (*Wall*) **Schottky**. (Syn. **Quercus polystachya**, Wall).

   Young shoots of inflorescence minutely tomentose. *Leaves* 5-7 by 2-2.5 in., ovate-lanceolate, acuminate, entire, thinly coriaceous, smooth; lateral nerves 10-12 on either side; base acuminate, decurrent on the petiole; petiole 5-7 in. long. *Male* and *Female flowers* in separate terminal panicles; female in distant glomerule of 3. *Ripe fruit* on short thick pitted rachis. *Cupules* serrate, connate. *Glans* sub-orbicular, smooth, shining, about 0.5 in. across and as long.

   MANIPUR, (5,000 ft.).
   
   Flrs. 2-4. Fr. 8-12.
3. **Pasania lappacea** (Roxb) Schottky. (Syn. *Quercus lappacea* Roxb.).

A small or middle-sized somewhat gregarious tree: branchlets rusty-pubescent. *Bark* grey, warty, fibrous; dark-brown inside. *Leaves* 4-9 by 1·5-2·7 in., oblong-lanceolate or oblanceolate, acuminate, entire, thinly coriaceous, glabrescent above but pubescent along the midrib and the nerves, puberulous beneath, more so along the nerves and midrib; lateral nerves 11-15 on either half; base acute or sub-acute, sometimes unequal and oblique; petiole 2-4 in. long; stipules linear, caducous. *Spikes* solitary, axillary, androgynous, rusty tomentose. *Male flowers* in glomerule or solitary; perianth-segments 5-6. *Female flowers* solitary. *Cupule* sessile, hard, cup-shaped, enclosing about half the ripe glan. 8 in. across; tubercles imbricate, spreading. *Glans* ovoid-conic, apiculate, 1-2 in. long, softly pubescent.

CACHAR, KHASI HILLS, SYLHET & DARRANG, (upto 4,000 ft.).

Pores uniform, large. Medullary rays very numerous, very fine, uniform; no broad rays.


4. **Pasania pachyphylla** (Kurz.) Schottky. (Syn. *Quercus pachyphylla* Kurz.)

Young shoots striate, puberulous. *Leaves* 4·5-7 by 1·5-1·75 in., oblong-lanceolate, rarely elliptic-acuminate or caudate-acuminate, entire, coriaceous, glabrous and shining above. Uniformly covered with a coating of very minute stellate hairs beneath (except nerves and midrib); lateral nerves 8-9 on either half; base unequal, acute; petiole 35·5 in. long, stout. *Spikes* solitary, axillary or terminal and fascicled; mostly male, a few androgynous. *Male flowers* glomerulate; perianth 5-6-toothed; stamens 10-12. *Female flowers* connate in groups of 3; stigma 3, erectopatent. *Fruiting spike* short. *Ripe cupules* crowded, connate into masses of 3 or 6, woody, hemispheric, 1-2 in. across (each). *Glans* depressed globose, glabrous, crowned by the remains of the united style, about 1 in. across.

DUFFLA HILLS & MANIPUR, (6,500-9,000 ft.).

Flrs. 6-7. Ripe fruit 1-3.

A middle-sized or large evergreen tree; young parts deciduously tawny-pubescent. *Bark* grey, rough, with cracks and irregularly shaped exfoliating woody scales, *5·75* in. thick; inside reddish-brown, coarsely fibrous and spongy, granular. *Leaves* 4-7 by *1·2·5* in., oblong-lanceolate or elliptic-lanceolate, acuminate, entire, coriaceous, glabrous; lateral nerves 11-13 on either half, slender but prominent beneath; base cuneate, often oblique; petiole *3·6* in. long; stipules linear-lanceolate, pilose. *Inflorescence* tomentose, crowded at the ends of branchlets, in panicles or fascicles bearing both male and female flowers. *Male flowers* in glomerules of 2-3, 3-bracteolate; perianth segments 5-6, tomentose outside; anthers about 12. *Female flowers* in glomerule of 3, one-bracteolate. *Cupule* almost enclosing the glans; scale, ovate, acute, connate at the base, pubescent; apex acute, incurved. *Glans* *6·8* in. in diameter, smooth, globose, apiculate. *Ripe fruit* 1-2 (by abortion) or in threes.

CACHAR, SYLHET, CARO HILLS, K. & J. HILLS & NAGA HILLS, (upto 500 ft.).

A very variable species.

Heartwood red, hard; pores large. Medullary rays very fine, numerous, uniform and equidistant. Used for agricultural implements in Khasi Hills.

Flrs. 9-10. Fr. 4-5.


A small tree or shrub (10-25'/8''-18''). *Bark* ashy-grey, split in square flakes, light dun brown inside, coarsely granular, *3·5* in. thick. *Leaves* 3-8 by 1-2·2 in., lanceolate, usually acuminate, entire, glabrous above when adult, more or less ashy-grey tomentose beneath; lateral nerves 8-14 on either half; tertiaries parallel and transverse; secondary nerves very fine; base acute or acuminate, often unequal; petiole *2·7* in. long. *Inflorescence* terminal, the spikes
(often androgynous) in panicles. Male flowers sessile in clusters of 3; bracteoles unequal; perianth segments 6; stamens about 10. Female flowers in clusters of 3, confluent at base; styles 3; linear. Cupule sessile, woody, enclosing almost the whole of the glans; scales pubescent, connate with a free apex forming tubercles. Glans turbinate or pyriform, 5-7 in. in diameter. Ripe fruit crowded on a stout long rachis or 1-3 together.

KHASI & JAINTIA HILLS, (upto 6,000 ft.).
Wood hard, reddish. Medullary rays of 2 classes, very broad with alternating numerous equidistant very fine ones. Good fuel.

Flrs. 1-2. Ripe fruit following cold season.

Var. Mannii—Flower spikes more slender. Leaves broadly lanceolate or ovate-lanceolate. Ripe fruit cylindric-oblong (not turbinate or pyriform).

KAMRUP (G. Mann). MANIPUR (C. B. Clarke).


A large tree. Bark whitish, plain, with vertical fissure and faint horizontal wrinkles; inside pale-brown, fibrous, soon turning darker-brown, soft, 6 in. thick. Leaves 4-7 by 1.75 in., elliptic-oblong or oblong-acuminate or caudate-acuminate, entire, thinly coriaceous, glabrous; lateral nerves 8-12 on either half, conspicuous; base acute or obtuse; petiole 3-4 in. long. Cupules connate, enclosing entirely the glans, woody, spiny or tubercled. Ripe fruits (including the connate cupules) about 1.5 by 2 in..

N. E. F. TRACT, MANIPUR, NAGA HILLS & GARO HILLS, (upto 65,000 ft).
Wood hard. Nuts are eaten raw or roasted.
Ripe fruit 12.


A large evergreen tree attaining a girth of 6'-8'-10'. Bark greyish-white, thin, reticulate and marked with close set broad lenticels outside; inside marked with longitudinal
Pasania.  

129. FAGACEÆ.  

raised strands; young shoots villous. Leaves simple, alternate, 7·1-10·2 by 2·1-3·2 in., oblong-elliptic, sometimes lanceolate, entire, long acuminate, chartaceous, glabrate above, underneath puberulous along midrib; lateral nerves 11-12, prominent beneath and impressed on the upper surface, curving near the edge and anastomosing; base slightly decurrent on the petiole, at times oblique; petiole about 3 in. long, pubescent. Flowers monoecious, male and female flowers in separate spikes. Male flowers in spikes crowded towards the tips of branches, bracteate; bract round to ovate, villous outside, glabrous inside, about 0·04 in. across; flowers minute, about 1 in. across; perianth segments 6; stamens up to 12; anthers joined at the tip, diverging below; filaments short; torus cottony. Female spikes erect, solitary, axillary 3·8 to 4·5 in. long, few flowered, each flower in a involucre of loosely packed fleshy pubescent scales when young; perianth segments short; staminodes few; ovary hairy; styles 3, hairy at the base; tip glabrous, recurved. Mature fruit generally solitary, ellipsoid with shallow depression at the top, 1·5 by 1·2 in.; involucre completely enveloping the nut, outside marked with scattered stout short more or less spirally arranged conical compressed tubercles sparsely distributed in the lower half but more or less crowded towards the tip. Glans ovoid-ellipsoid, truncated at tip, crowned by the remains of the style, about 1·2 by 0·9 in.  

N. E. F. TRACT, Pasighat Res. 500-700 ft.  
Flrs. 10-11. Fr. 7-8. 

Kew confirms this as a new species. There is some similarity with Pasania xylocarpa (Kurz) Schottky (Quercus xylocarpa Kurz) but in this case the leaves are bigger and their lower surfaces are not glaucous; the cupules are generally solitary, elongate, ellipsoid instead of being depressed globose; the tubercles on the cupule-covering are less numerous, shorter and stouter; the apices of the tubercles are not produced into spreading or reflexed points.  

8. Pasania truncata (King) Schottky. (Syn. Quercus truncata King).  

A very handsome tree, glabrous (except inflorescence). Leaves 5-8 by 1·75-3 in., ovate-lanceolate to oblong-lanceolate, acuminate, entire, glabrous; lateral nerves 9-12 on either
half; base narrowed into the petiole (about \(\cdot 65\) in. long). *Spikes* solitary, axillary or in small terminal panicles; female spikes few and below the male. *Male flowers* in glomerule of 4-8; each glomerule with long subulate bracteoles; perianth with blunt segments, tomentose outside; stamens 8-10. *Female flowers* in glomerule of 3 or more; style erect, sub-divergent. *Ripe fruit* on a stout pendulous lenticellate rachis. *Cupules* woody, sessile, sub-infundibuliform at first, afterwards sub-hemispheric. *Glans* depressed-ovoid, sericeous, enclosed in the cupule except the flat apex.

**NAGA HILLS**—Pipphema, (2,000 ft.).


A large tree. *Bark* grey or darkish-grey, rough or warty, often with vertical lenticels, reddish-brown, fibrous. \(\cdot 25\) in. thick; young branches puberulous. *Leaves* 4-13 by 3-5 in., elliptic-oblong or oblong-acuminate, entire, glabrous and shining above, minutely pubescent beneath; lateral nerves 12-14 (often up to 17) on either half, conspicuous below; base acute; petiole \(\cdot 7-1\cdot 3\) in. long; stipules subulate, with fugacious glandular hairs. *Male flowers* in erect tomentose axillary and terminal panicles. *Female spikes* solitary, axillary. *Flowers* in glomerule of 3. *Cupules* completely enveloping the glans except the umbo, sometimes coalescing with 5-7 faint concentric belts which are obscurely crenate. *Ripe fruit* rather turbinate or ellipsoid, about 1\(\cdot\)9 by 1\(\cdot\)2 in.

**LAKHIMPUR** (Makum Range), **MISHMI HILLS**, **DUFFLA HILLS** & **N. E. F. TRACT**.

*Medullary rays* conspicuous. Wood cream coloured.

*Flrs.* Cold season. *Ripe fruit* following cold season.

3. **CASTANOPSIS** Spach.

Evergreen trees, rarely shrubs. *Male catkin* erect, mostly in terminal panicles. *Female* 1-3 in one involucre. *Nuts* wholly enclosed, covered with spines or tubercled. *Pith* usually quadrangular, medullary rays of most species uniform, very fine and equidistant (Brandis).

*Fruit* ovoid or globose, involucre dehiscent, spinous:

- Leaves sharply serrate. . . . . 1. *C. indica.*
Leaves usually entire:—
Leaves serrate when young, often entire when adult:—
Walls of involucre concealed by subulate spines:—
Branchlets, petioles and under-side of leave pubescent or tomentose:—
Nerves 10-14 on either half. . . . .
Branchlets, petioles and leaves glabrous or nearly so:—
Leaves lanceolate, elliptic-lanceolate or oblanceolate up to 8·5 in. long. Leaves ovate-oblong, up to 12" long (nut single). . . .
Walls of involucre bearing spines in tufts but not completely concealed by them; spines in ridges:—
Leaves glabrous, entire. . . . .
Leaves cinereous or ferrugeneous, pubescent beneath, entire or serrate towards the apex. 6. C. tribuloides.


A middle-sized or large tree (90'/80''). Bark greyish, warty, somewhat deeply fissured vertically, with exfoliating scales, ·5 in. thick; blaze light-brown with interrupted tangential bands, fibrous, turning deep blackish-brown; young parts rusty-tomentose or pubescent. Leaves 3-7·5 by 1·3-3 in., elliptic-oblong or oblong-lanceolate, acute or acuminate, spinous-serrate, coriaceous, glabrous above, rusty-tomentose beneath; lateral nerves 14-20 on either half, conspicuous beneath, subparallel; midrib depressed above and pubescent; base rounded or obtuse, occasionally unequal sided; petiole ·3-5 in. long. Male spikes in lax panicles, longer than the leaves; stamens 12. Female spikes axillary, solitary. Flowers solitary. Ripe involucres 1-1·5 in. in diameter, thin walled, densely covered with straight unequal radiating subulate pubescent spines, the longest about ·5 in. long. Nut ovoid. ·3 by ·5 in.
Common throughout the province (upto 4,000 ft.). Leaves are used for cigarettes and fruits are eaten. Wood is used for handles of axes etc.

Flrs. 2-4. Fr. 10-12.


A large evergreen tree (100'/72''); young parts pubescent; stem often fluted. Bark plain, greyish, cinnamon-brown, with vertical lines of lenticels and horizontal wrinkles, 25 in. thick; inside fibrous and somewhat granular, light pinkish. Leaves 3-7 by 1-3 in., lanceolate or narrow-elliptic, acuminate, quite entire or sparingly toothed towards the apex, coriaceous, dark glossy green above, minutely scaly tomentose beneath; lateral nerves 7-9 on either half; base acute, obtuse or rounded, often unequal; petiole 3-6 in. long. Spikes stout in small panicles; male spikes numerous; female few. Female flowers in threes; bracteoles pubescent, scarious. Fruit solitary, congested in spikes 1-2 in. long. Involucre often splits into 3-4 parts, exposing the glans; spines compound, often 3-fringed, pubescent, covering the whole surface, rather wiry, 1-25 in. long, often very sharp pointed. Nuts ovoid, conic, more or less 3 angled, about 5 in. long.

GARO HILLS, KHASI HILLS, N. C. HILLS, N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, NOWGONG, DARRANG, GOALPARA & CACHAR, SYLHET.

Wood greyish, hard. Annual rings distinct. "Medullary rays very fine, numerous, uniform and equidistant with numerous short transverse bars forming concentric belts; weight 45-47 lbs. per c. ft."

Timber is used for building purposes and is also used for railway sleepers after treatment (creosote).

Flrs. 12-3. Fr. Following cold season.


An evergreen tree 50'-60' tall, glabrous. Bark greyish. Leaves 4·5-8·5 by 1·5-2 in., lanceolate or oblong-lanceolate,
acuminate, thinly coriaceous, glabrous, pale beneath; lateral nerves 9-10 on either half, slender, arcuate; base acute; petiole \( \cdot 4 - \cdot 6 \) in. long. *Spikes* pubescent. *Female flowers* solitary. *Involucres* solitary and clustered, globose, tomentose; spines \( \cdot 5 \) in. long, pubescent, tufted on short woody stalks. *Nut* solitary, half adnate to the involucre.

Rongbyreng—KHASI HILLS, 4,000 ft. and NAGA HILLS, 6,000 ft.  
Ripe fruit 5-7.

4. **Castanopsis castanicarpa** Spach.

Young shoots softly tomentose. *Leaves* 10-12 by 4-9\( \cdot 5 \), ovate-oblong of obovate-oblong, shortly acuminate, entire sub-coriaceous, shining and glabrous; lateral nerves about 10 on either half; reticulation minute; base acute; petiole stout, \( \cdot 5 \) in. long. *Female spikes* solitary, axillary, shorter than the leaves; the flowers solitary or in threes. *Ripe involucre* ovoid, 1.25 in. long, densely covered with straight flat sub-pubescent sharp weak spines (about \( \cdot 3 \) in. long). *Nut* single, ovoid.

MANIPUR & KHASI HILLS (?) No specimen in Forest Herbarium, Shillong.

Young fruit 8. Ripe fruit 12.


A middle-sized tree (65'/60''); young parts pubescent. Bark thin, greyish-brown, warty, irregularly and deeply cracked, pale-brown inside and fibrous, turning dark purplish brown. *Leaves* bifarious, 3-9 by 1-3 in., lanceolate or oblong-lanceolate, acuminate, entire, thinly coriaceous, shining above, pale beneath; lateral nerves 9-13 on either half, sub-parallel, arcuate at the margin, prominent beneath; base acuttt or obtuse; petiole \( \cdot 2 - \cdot 5 \) in. long. *Male spikes* erect, solitary or sub-panicled with the male spikes. *Female flowers* solitary. *Ripe fruit* ovoid, often depressed or flattened and elonvated breadth-wise, about 1.5 in. across, thick walled, pubescent, spiny; spines in numerous groups (not
completely covering the wall), simple or branching, flattened, sharply apiculate. Nut solitary, ovoid but compressed or flattened.

GARO HILLS, K. & J. HILLS, SIBSAGAR, LAKHIMPUR & N. E. F. TRACT, (upto 3,000 ft.).

Medullary rays broad.

Flrs. 10-12. Fr. 8-12 (following year).


A middle-sized, often large evergreen tree (80'/180''): young shoots more or less pubescent. Bark dark-grey, corky outside, 1/2 in. thick, uniformly very fibrous; inside light-brown, turning dark purplish-brown. Leaves 2-7 by 1-2.5 in., lanceolate, oblong-lanceolate or ovate-lanceolate, acuminate, entire, sometimes serrate towards the apex, rather coriaceous, glabrous above, purplish or reddish beneath, sometimes pubescent or with a thin coat of matted shining tomentum; lateral nerves 9-14 on either half; base acute; petiole 3.7 in. long. Male spikes minutely tomentose, paniculate or fascicled. Female spikes solitary. Flowers solitary; involucres solitary or in pairs, tomentose; spines about 3 in. long, on short ridges, stellate or branched. Ripe fruit 7-1 in. in diameter. Nuts 1-3, glabrous; cotyledon ruminated.

GARO HILLS, CACHAR, SYLHET & SIBSAGAR.

Wood moderately hard with numerous fine uniform and equidistant medullary rays. Wood is sometimes used for planks etc. The fruit is eaten.

Flrs. 9-11. Fr. Following cold season.

Of the distinguishable forms, the following are recorded from Assam.

(1) Var. typica King:—Leaves entire, cinereously pubescent. Spines wiry, numerous, covering the walls of the involucres. Nuts usually solitary.

Common.
(2) Var. ferox King. Vern. Chhakhu, Garo; Dieng-sning, Khasi. 
Bark sometimes cinnamon brown; blaze yellowish, turning brown, 
mottled with brown spots. Leaves usually entire (sometimes serrate. 
Involucres larger than (1), spines fewer and stouter. Nuts 1-3. 
GARO HILLS, SIBSAGAR and K. & J. HILLS.

(3) Var. Longispina King. Leaves larger. Spines stout, short, 
often .5 in. long. Nuts 1-3. 
KHASI HILLS.

(4) Var. echinocarpa King Pubescent, ferruginous. Involucres 
smaller than the typical forms and less covered by spines which are 
shorter and fewer and in horizontal belts or more or less in vertical 
rows. Nut solitary. 
K. & J. HILLS.

(5) Var. Wattii King. Involucre small, thick and almost woody, 
MANIPUR, KHASI HILLS.

4. CASTANEA Tourn. Sweet Chestnut.

Castanea sativa Miller. Sweet chestnut.

A middle-sized deciduous tree. Bark ashy-grey, longitudinally furrowed. Leaves 4-8 by 1·5-2·5 in., oblong or elliptic, acuminate, sharply serrate, coriaceous, glabrous above, pubescent beneath; lateral nerves 13-20 on either half. very conspicuous beneath, sub-parallel; base rounded or obtuse; petiole .5-1 in. long. Spikes axillary, the lower male, the upper androgynous. Male flowers in dichasia of 3-7. Female flowers in group of 3 in one involucre. Ovary 6-celled; styles 6. Nuts 3, enclosed in the densely spinous involucre splitting into 2-4 valves.

Native of SOUTH EUROPE. Cultivated in Shillong for the fruits which are edible.

Long lived; growth rapid when young. Fairly good timber; medullary rays uniform, very fine; coppices well.

Flrs. Hot season. Fr. Autumn.
FAM. 130. BETULACEÆ.

Trees or shrubs, usually deciduous. Leaves alternate, usually undivided, as a rule serrate; stipules membranous, soon falling. Flowers monœcious. Male flowers in drooping catkins, united to the bract and may have a perianth; stamens 2-12; anther-cells as a rule distinct. Female flowers in long or short spikes, 2 or 3 in the axil of 1 or several bracts; perianth 0 or adnate to the ovary which is 2-celled; ovule one in each cell, pendulous; style 2, filiform. Fruit usually a one seeded-nut; bracts and bracteoles enlarged in fruit into a scale or cup-like organ, often remaining attached to the fruit. Seeds exalbuminous; radicle superior.

Male flowers solitary, naked on bract:—
Bracts greatly enlarged in fruit; nut small, adnate to the base of a large reticulate wing-like bract. .......... 1. Carpinus.

Male flowers (with perianth) in dichasium:—
Stamens not bifid:—
Bracts of the fruiting spike forming the fruit resembling a cone. .......... 2. Alnus.

Stamens bifid:—
Bracts of the fruiting spike not forming the fruit resembling a cone, but accrescent in fruit forming 2 small membranous wings to the nut. .......... 3. Betula.

1. CARPINUS Tourn.

Carpinus viminea Wall.

A middle-sized tree; stem irregularly fluted; bark grey, with darker streaks; branches verrucose. Leaves 3-4 by 1-2 in., ovate-lanceolate, caudate-acuminate, doubly serrate, membranous, glabrous; lateral nerves prominent, 10-12 on either half, parallel; base rounded or sub-cordate; petiole 1-·5 in. long, hairy. Male spikes 1-2 in. long; bracts ribbed, shining, ciliate; anther-cells with a tuft of long hairs at the apex. Female spikes 2-4 in. long; bracts 1 in.
long, lanceolate, unequal-sided, serrate on the broader side, often lobed at the base. Nut 1.15 in. long, glandular.

KHASI HILLS.
Wood white, moderately hard; weight 50 lbs. per c.ft.

Flrs. 1-4. Fr. 6-7.

2. ALNUS Gærtn.

Alnus nepalensis D. Don.
A large deciduous tree; bark compact, silvery-grey; branchlets glabrous; young shoots usually pubescent. Leaves alternate, 2.5-7 by 1.5-3.5 in., elliptic or elliptic-lanceolate, acute, entire or somewhat denticulate, coriaceous, glabrous above, slightly pubescent along the nerves beneath when young, usually glaucescent and dotted with resinous minute dots; lateral nerves 10-18 on either half; base narrowed or rounded; petiole 3-8 in. long. Male catkins 4-10 in. long, terminal, drooping, panicled; flowers supported by bracts and bracteoles; bracts 3-flowered with usually 4 bracteoles adnate to each bract; sepals 4; stamens 4; anther-cells connate. Female spikes 2-3 in. long, erect. Cones (fruiting spikes) 5-9 by 3 in ovoid or cylindrical, in lateral panicles. Nut with membranous somewhat irregular wing, remaining long on the tree.

UPPER ASSAM, MISHMI HILLS, AKA HILLS & KHASI HILLS, (upto 9,000 ft.).
The bark is used with Rubia for dyeing to deepen the colour.

Flrs. 10-12. Fr. 2-3 (remains long on the tree).

3. BETULA Tourn.
Deciduous trees or shrubs; outer bark papery, peeling off in horizontal flakes. Leaves penninerved, toothed or serrate, acute or acuminate; stipules deciduous. Flowers monoecious. Male flowers in pendulous catkins; bracts stalked, peltate, bearing on the inner face 2-3 bracteolate flowers; sepals 2-4; stamens 2; filaments forked, separating the anther-cells. Female flowers in erect or drooping spikes; bracts imbricate, each with 2 bracteoles on either side; perianth 0. Ovary 2-celled, compressed; ovules 1 in each cell;
style 2, slender; stigma terminal. *Fruiting spike* of deciduous 3-lobed scales and winged or margined nuts.

Lateral nerves 10-15 on either half:—
   Nut with wings broader than itself:—
      Wood white. ..................................... 1. *B. alnoides*.

Lateral nerves 6-10 on either half:—
   Nut with scale-like margin:—
      Wood reddish brown. ................................ 2. *B. cylindrostachys*.


A moderate-sized tree, often gregarious; bark lenticellate, peeling off horizontally in somewhat narrow rolls; outside grey or brownish with thin layers of papery cork and white underneath the corky layers; inside light-brown, turning darker, granular, 5 in. thick; young parts pubescent or tomentose. *Leaves* 2-5 by 1-2·5 in., ovate to lanceolate, acuminate, very irregularly doubly cuspidate-serrate, sub-coriaceous, pubescent beneath when young, dotted with resinous scales when mature; lateral nerves 10-15 on either half; base rounded or sub-cordate; petiole 2·8 in. long, hairy; stipules 3 in. long, lanceolate. *Male catkins* 2-5 in. long; bracts, stamens and ovary hairy. *Female spike* about the same size usually. *Fruiting spike* often up to 3 in. long. *Fruit* broader than the bracts; wings broader than the nut.

N. E. F. TRACT, GARO HILLS, CACHAR, N. C. HILLS, MANIPUR and K. & J. HILLS, (upto 5,000 ft.).

The wood is white, fairly close grained. Weight 41 lbs. per c.ft. Probably will be useful for manufacture of ply woods.

Flrs. 4-5. Fr. Rainy season.


A very large and lofty tree (100'/100''); bark grey, exfoliating in large papery flakes which often overhang; inside reddish-brown, 3 in. thick, mottled with coarse fibres (sap has a strong castor oil like smell); crown spreading (60' diameter); twigs dark, purplish-brown, strongly speckled white. *Leaves* 2-6 by 8·3 in., ovate, lanceolate, acute or
acuminate, doubly serrate, coriaceous, glabrous above; dotted beneath; lateral nerves 6-10 on either half, with elegant reticulations; base rounded or obtuse; petiole 0.5-1 in. long. Male flowers in dense catkins 3-6 in. long. Fruiting spikes panicked, 3-4 in. long. Fruit scale-like, 0.05 in. broad with 2 membranous winged margin.

GARO HILLS, KHASI HILLS & NAGA HILLS, (upto 4,600 ft.). Wood reddish-brown, heavy, very hard; medullary rays all more or less of same thickness, very close, straight, parallel; pore is of diameter equal to or slightly less than the space between 2 contiguous medullary rays, scanty, uniformly scattered; annual rings indistinct. Should be quite suitable for manufacture of ply wood. (Fruit also eaten).

Frs. & Fr. 3-6.

FAM. 131. SALICACEÆ.

Trees or shrubs, deciduous, fast growing, with much vegetative reproduction by suckers; almost always dioecious; buds scaly. Leaves alternate, simple, stipulate. Flowers naked, in catkins or spikes, each on the axil of a bract; bracteole 0. Perianth 0; disc of 1 or more glands or cup-shaped. Male flowers stamens 2-30. Female flowers ovary sessile or stipitate, usually of 2 carpels (rarely 3), 1-celled; placenta parietal; ovules many, anatropous. Fruit capsular, 2-4 valved. Seeds many, minute, exalbuminous, with a basal tuft of long silky deciduous hairs; embryo straight; cotyledons plano-convex; radicle short, inferior.

Disc of 1 or 2 separate glands:—
Stamens usually 2 (upto 12):—
Fruit 2-valved:—
Petiole short. . . . . . 1. Salix.
Disc annular or cupular:—
Stamens usually more than 2 (numerous):—
Fruit 2-4-valved:—
Petiole long. . . . . . 2. Populus.

SALIX Linn.

Deciduous trees or shrubs. Leaves alternate (rarely opposite), usually narrow lanceolate, ovate or elliptic;
petioles short; stipules various. *Bracts* entire. *Disc* usually of 1 or 2 glands. *Stamens* 2-12; filaments long, filiform. The valves of capsule usually rolled back when ripe.

Stamens 5-10:—
- Capsule glabrous or puberulous. .. 1. *S. tetrasperma.*
- Capsule densely woolly. .. 2. *S. ichnostachya.*
- Capsule woolly. .. 3. *S. psilostigma.*

### 1. *Salix tetrasperma* Roxb.
**Vern.** Seemir-asing, Miri.; **Pani-hijal,** Sylh.; **Bhe,** Ass.; **Besbiphang,** Mech.; **Bol-slak,** Garo; **Jamynrei,** Khasi; **Dieng-um,** Synt.

A middle-sized tree. *Bark* dark-grey or dark-brown, deeply and vertically furrowed, •3-•5 in. thick; blaze light-red, fibrous; young parts silky. *Leaves* 1•5-6 by •6-2•2 in., lanceolate, ovate-lanceolate or oblanceolate, acuminate, cuspidate, serrulate, rarely entire, sub-coriaceous, glabrescent above, glaucous beneath; lateral nerves many, conspicuous; petiole •2-1 in. long; stipules caducous, prominent in young shoots. *Male catkins* 2-4 in. long. *Female catkins* 3-5 in. long; disc glands fleshy, yellowish; stigma 2-branched. *Capsule* •15-•2 in. long, on slender stalk (of nearly the same length), in groups of 3-4. *Seeds* 4-6.

Common throughout the province on river banks and low lying moist places, often gregarious. Wood whitish, 53 lbs. per c.ft. Wood is used for ploughs and planks. Recently tried successfully in match industry. Leaves are cattle fodder. Twigs are used for basket making.

Flrs. Autumn. Fr. Cold weather (sometimes flowers in hot weather).

### 2. *Salix ichnostachya* Lindl.

A middle-sized tree; young parts silky-pubescent. *Leaves* 1-2•6 by •3-•8 in., lanceolate or ovate-lanceolate, acuminate, serrate, usually glaucous beneath; base acute, lateral nerves 10-14 on either half, not very distinct; petiole •3-•5 in. long. *Catkins* densely woolly; male laxly flowered;

ASSAM (D. Chatterjee).

Flrs. Rainy season. Fr. 10-11.


A spreading shrub. *Bark* blackish, smooth. *Leaves* 1·3-4·3 by 3·1 in., lanceolate, acute or acuminate, entire, serrate or obscurely crenate, coriaceous, glabrescent and dull green above, densely white tomentose beneath; lateral nerves impressed above; base rounded or sub-cordate; petiole 0·05-0·2 in. long; stipules sub-cordate. *Bracts* densely villous. *Stamens* 2; anthers yellowish. *Capsule* 1 in. long, sessile.

Common throughout K. & J. HILLS. (upto 6,400 ft.).

Flrs. 3-4. Fr. 7-8.

*Salix babylonica* Linn.—The *Weeping Willow*, sometimes cultivated in garden.

2. *POPLUS* Linn.

*Populus ciliata* Wall. The Himalayan Poplar.

A lofty tree; bark grey, smooth on young plants, vertically wrinkled or fissured on old stem; buds viscid, lanceolate. *Leaves* 3-7 by 2·5-5 in., broadly ovate, acuminate, finely dentate, glandular ciliate (margin), glabrous; base cordate, 3-5 nerved; lateral nerves 4-5 on either half (above the basal), irregularly forked; petiole 2-5 in. long, compressed above. *Flowers* in lateral catkins (before the appearance of new leaves). *Male catkins* 2-4 in. long, somewhat interrupted; stamens numerous; filaments short, slender. *Female catkins* 6-9 in. long, lax (in fruit); disc toothed, embracing half the ovary; bracts caducous; stigma 3-4, sub-sessile, obcordate. *Capsule* 3-5 in. long, 3-4 valved, ovoid; stipes and hairs of the seeds as long as the capsules.

AKA HILLS, (Dr. N. L. Bor). Cultivated in Shillong (K. & J. Hills).

Flrs. Hot season. Fr. 5-6.
GYMNOSPERMS.

FAM. 132. GNETACEÆ.

Trees or shrubs, erect or climbing; stem and branches articulated. *Leaves* opposite, large and green or reduced and scale-like, exstipulate. *Flowers* unisexual, dioecious, numerous, in axillary or terminal spikes or cones. *Male flowers* tubular of 2-4 sepals; anthers 2-8, sub-globose, 1-3-celled, sessile or sub-sessile in the column of the united filaments. *Female flowers* ovule one, erect, with 2 or 3 integuments of which one is produced into a tube with discoid mouth and functions of a style. *Seeds* dry or drupaceous; albumen copious or scanty; embryo straight; cotyledons adpressed; radicle long, superior. *Resin* ducts absent; vessels present in the secondary wood.


GNETUM Linn.

Mostly evergreen climbing shrubs, a few erect or small trees. *Leaves* decussate, entire, leathery. *Flowers* usually dioecious (in spikes which are more usually grouped into more complex inflorescence) whorled in the axils of cup-shaped bracts, usually surrounded by jointed hairs. *Male flowers* perianth narrowly clavate, entire or valvately 2-fid; anthers 2, sessile, 1-locular, opening by terminal slits. *Female flowers* perianth tubular; ovule erect, solitary, orthotropous with 2 integuments, the inner integument projecting as a slender exserted tube with the functions of a style, often toothed or fimbriate, ultimately after fertilization the perianth becoming fleshy, outer integument woody forming a drupaceous fruit.

Ovary and fruit sessile, tree. .. 1. *G. Gnemon.*
Ovary and fruit stipitate, climber. .. 2. *G. montanum.*
1. **Gnetum Gnemon** Linn. Vern. Han-thu, Mik.; Annel, Lush., Kuki; Mejherguti, Ass.

An ever green shrub or a small tree, sometimes middle-sized. *Bark* greenish (young stem green) 1 in. thick, green below the cuticle; blaze green, exuding watery juice; wood cream coloured. *Leaves* 2-5-9-5 by 1-3-5 in., elliptic-lanceolate or elliptic-oblong, acuminate, entire, rather coriaceous, glabrous, glossy green above, paler beneath; lateral nerves 8-12 on either half, arcuate, running into an intra-marginal nerve, somewhat away from the margin; base acute; petiole 2-6 in. long. *Male spikes* 1-1-5 in long, slender. *Female spikes* about 1 in. long, often branched; rachis thicker; cupular bract acuminate, distant. *Fruit* oblong, apiculate, 5-7 in. long, reddish when ripe.

SIBSAGAR, MANIPUR, CACHAR, DARRANG and K. & J. HILLS.

Flrs. 2-4. Fr. Rainy season.

Markgraf has subdivided this species into several varieties of which the following are represented in Assam:—

**Var. Brunonianum** (Griff) MG.F.

Shrub. *Inflorescence* mainly simple, long, lax. *Female flowers* sterile, globose, shortly and obtusely apiculate. *Fruit* oblong, entirely punctate.

DARRANG, NAGA HILLS, CACHAR & LUSHAI HILLS. (U. N. Kanjilal’s, No. 3741).

Male flrs. 1-2. Female flrs. 4.

**Var. Griffithii** (Parlat) MG.F.

Shrub. *Inflorescence* mainly short, often with ramification, always contracted. *Fruit* sub-globose, evenly granulose.

SIBSAGAR (Barpathar) & NAGA HILLS. (U. N. Kanjilal’s No. 3885).


A large evergreen climber; stem woody. *Bark* dark-grey, corky, about 3 in. thick, peeling off in pieces; blaze brownish. *Leaves* opposite, 3-8 by 2-5 in., elliptic or ovate-
oblong, bluntly acuminate, entire, sub-coriaceous, glabrous, glossy; lateral nerves 8-12 on either half, arcuate, slender, prominent below; base cuneate or rounded; petiole 3-8 in. long. Flowers dioecious, in rigid panicled spikes; bracts of males closely imbricate, those of females interrupted. Fruiting spikes 3-10 in. long. Fruit drupaceous, stipitate, ellipsoid, 75-1.5 in. long, reddish-orange when ripe (not apiculate).

Common throughout the province.
Fruits are edible.

Flrs. 2-4. Fr. Cold season.

**Forma megalocarpium** MG.F. n.f.
Leaves large. Fruit 1-2 in. long, 7 in. broad; stalk 32 in. long.
DUFFLA HILLS, (Lister).

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**FAM. 133. TAXACEÆ.**

Trees or shrubs. Leaves mostly narrow, linear or lanceolate. Flowers mostly dioecious. Pollen sacs born on the undersurface of the sporophylls which are scale-like. Carpels usually few or even 1, terminal, with 1-2 ovules each. Seeds projecting beyond carpels or even naked, with fleshy aril or drupaceous testa; cone formation imperfect. Seeds 1 or few, not connected by the scale.

Pollen grains winged. Seed erect or partially inverted:

Ovuliferous scale completely curved into itself. Carpels small. 1. Podocarpus.
Pollen grains not winged. Seed inverted:
Female flowers usually single, only one of pair developed:
Ovules erect, solitary. 2. Taxus.
Female flowers of several decussate carpels:
Ovules erect in pairs. 3. Cephalotaxus.
1. **PODOCARPUS** L’Herit.

Evergreen trees or shrubs. *Leaves* variable, linear-lanceolate or elliptic or dimorphic, some scale-like and imbricate, others distichous linear or subulate on the same branch. *Flowers* monoeocious or dioecious. *Male flowers* solitary, fascicled or spicate, with imbricate bracts; antheriferous scales numerous, imbricate, cells 2 on the under side; connective clawed or appendaged at the apex; pollen-grains winged. *Female flowers* usually solitary, pedunculate; spicate bracts large; ovules reflexed on a stalk consisting of connate bract and scale. *Seeds* small, globose or ovoid, seated on the enlarged fleshy stalk; testa hard, often fleshy externally; albumen fleshy; cotyledons 2.

Leaves linear, midrib quite distinct on both surfaces. Seeds ·2·3 in. across. .. 1. *P. neriifolia*.  
Leaves lanceolate or elliptic-oblong, midrib obsolete. Seeds ·6·1 in. across. .. 2. *P. latifolia*.


A tall tree 40-60 ft. high, glabrous; branches whorled. *Bark* light cinnamon brown, peeling off in long papery flakes, ·16 in. thick, reddish and finely fibrous inside. *Leaves* scattered, 4-10 by ·4·8 in., linear-elongate, lanceolate, acuminate, entire, thickly leathery, glabrous; midrib very prominent on both surfaces; longitudinal nerves rather obscure; base cuneate; petiole ·1·3 in. long. *Male flowers* in clusters or spicate. *Seeds* solitary, globose, ·6·7 by ·3·5 in., bluish-black when ripe; enlarged fleshy peduncle about ·4 in. long.

N. E. F. TRACT, LAKHIMPUR, CACHAR, K. & J. HILLS & SIBSAGAR. (upto 4,000 ft.)  
Wood yellowish, even grained. Annual rings rather faint; medullary rays numerous, very fine. Weight 38 lbs. per c. ft.  
A timber of some importance in Surma Valley, highly prized in Burma.

Flrs. Rainy season. Fr. Cold season.

A large evergreen tree. *Leaves* opposite or nearly so, 3·5-7 by 8-2·5 in., lanceolate or elliptic-oblong, acuminate, entire, coriaceous, glabrous, longitudinal nerves numerous, very slender; midrib obsolete; base rounded, narrowed into a short petiole (1 in. long). *Male flowers* in clusters; antheriferous scales ovate, acuminate. *Seeds* solitary, 6-1 in. across, seated on a fleshy enlarged peduncle.

CACHAR and K. & J. HILLS, (5,000 ft.).

Wood grey, slightly aromatic, even grained, moderately hard. Annual rings rather obscure, medullary rays very fine, numerous.

Flrs. Rainy season. Fr. Cold season.


Barak Reserve (CACHAR) Sheet No. 4795. It appears to be *P. latifolia* Wallich, and I agree with Dallimore and Jackson in reducing *P. latifolia* of Wallich. to *P. Wallichianus* C. Presl.

2. **TAXUS** Tourn.


A slow-growing, small or medium sized evergreen tree; stem fluted, crown spreading. *Bark* greyish-brown, softly corky, peeling off in longitudinal thin shreds; inside light-pink with thin fibrous plates. *Leaves* distichous, 1-1·5 by 1 in., linear, flattened, often cuspidate-acuminate, dark-green and shining above, pale yellowish-brown or rusty beneath, with obscure stomatic lines; 1-nerved; base narrowed into a short petiole. *Flowers* usually dioecious. *Male flowers* pedicelled, sub-globose; scales peltate, numerous, each bearing on the underside 3-6 anther-cells dehiscing longitudinally. *Female flowers* solitary, axillary, consisting of a few imbricating scales, round an erect ovule situated on a membranous cup-shaped disk enlarged bright red and succulent in fruit only the tip being exposed. *Seeds* compressed, wingless, olive-green; testa woody; cotyledons 2.
KHASI HILLS, MISHMI HILLS & BALIPARA FRONTIER TRACT. (Piri upto 10,000 ft.).

Sap-wood white; heart-wood orange-red; close grained, elastic, hard, takes a fine polish. Annual rings very fine, very numerous. Weight 44 lbs. per c. ft., immensely suitable for cabinet work.

Flrs. 3-5. Fr. 9-11 (ripening in the following year).

3. CEPHALOTAXUS Sub et Zucc.

Evergreen trees or shrubs; all shoots of unlimited growth. Leaves alternate, spirally arranged and spreading on vertical shoots, distichous on lateral shoots, linear, flat, pointed, shining, green above, usually with 2 silvery bands beneath composed of many stomatic lines, a large resin canal near the underside between epidermis and fibro vascular bundle of the midrib; midrib conspicuous. Flowers dioecious. Male flowers in axillary globose heads, 6-11 flowered, supported by a small involucre of imbricating scales; bracts membranous, one flowered. Stamens 7-12; scale stipitate bearing on its back 2-3 anther sacs; pollen grains globose. Female flowers small in stalked cones, several in the axil of bracts at the base of terminal shoots which lengthen out after fertilization; scales many on the fleshy axis of the cone, each bearing 2 ovules at the base, one of which only develops, scales become fleshy and often connate at a later stage and the seeds then appear to become enclosed in fleshy cups. Seeds large, drupaceous, with fleshy aril; cotyledons 2.

Leaves narrowed towards the base, pale green beneath.

Leaves with a broad rounded base, whitish beneath.

1. Cephalotaxus Mannii Hk. f.

A small tree. Bark cinnamon-brown. Leaves 1-2.2 by 1-1.15 in., linear, sub-falcate, gradually narrowed from the base, apiculate, pale green beneath; midrib more prominent above; base acute or obtuse. Anthers about 12, mucronate. Female cones 3-4, on a common peduncle; bracts adnate, ovate, obtuse. Seeds 1.25-1.5 in. long, obovoid, narrowed at the base, with a short apical point.
KHASI & JAINHIA HILLS and NAGA HILLS, (4,500-8,500 ft.). Flrs. 3-5. Mature fruit. 3-7 (following year).

2. Cephalotaxus Griffithii Hook. f.

A middle-sized tree; branches elongate. Bark brownish, smooth. Leaves 1-1.5 by 1-1.5 in., more or less falcate, sub-acute, patent or almost so; base partially inequilateral, truncately rotundate or partly sub-cordately incised, often attenuate, whitish beneath; midrib more prominent above. Seeds .8-.9 in. long, sometimes longer, born 3-4 together with a short apical point and narrowed at the base.

NORTH EAST FRONTIER TRACT, NAGA HILLS, MANIPUR & MISHMI HILLS, (5,000-6,000 ft.)

FAM. 134. PINACEÆ.

Trees or shrubs, mostly evergreen. Leaves usually needle-like or scaly. Flowers mostly monoeocious. Male flowers in deciduous catkins consisting of numerous sporiphylls which are usually scale-like and bears 2-6 (rarely less or more) pollen sacs on the lower surface. Female flowers in cones consisting of scale-like open carpels which are flat or peltate and bear directly or on a subsidiary placental scale 1-many ovules. Seeds concealed between scales of a perfect cone; testa woody or leathery (no aril).

The wood is without vessels. Resin canals are present. It consists of long thick-walled tracheids arranged in radial lines with large bordered pits.

Cones perfect. Seeds concealed between scales, no aril:—

(i) Leaves spirally arranged; carpels simple with 1 reversed ovule in the centre.
Seeds adherent to scales . . . . . . . 1. Araucaria.

(ii) Leaves spirally arranged; ovules reversed; scales of cones numerous, spirally arranged:—
Pollen grains winged:—
Long shoots only present:—
Needles 4-angled. Cones pendulous; scale persistent. ..
Needles flat. Cones upright, scales deciduous. ..
Long and short shoots both present:—
Long shoots with scaly leaves, short shoots with green needles.
Needles on both shoots. ..
Pollen grains not winged:—
Needles flat. Cones pendulous, scales persistent. ..

(iii) Leaves spirally arranged; ovules erect; scales rudimentary or weakly developed:—
Long shoots only present; carpels with toothed scale. ..

(iv) Leaves opposite or whorled, rarely alternate, often heterophyllous; ovules erect; scales of cones few:—
Cones woody when ripe; carpels peltate. Seeds with orbicular wing.
Cone baccate or drupacious. Seeds not winged. ..

(3) Needles 4-angled. Cones pendulous; scale persistent.

2. Picea.

3. Abies.

4. Pinus.

5. Cedrus.

6. Tsuga.

7. Cryptomeria.

8. Cupressus.


1. ARAUCARIA Juss.

Araucaria excelsa R. Br. (Norfolk Island Pine).

A handsome tree with graceful feathery branches; main branches horizontal, whorled; lateral branchlets horizontal or pendulous; outer bark peeling off in thin flakes. Leaves dimorphic, needle-like, incurved, bright green on young or lateral branchlets (0.5 in. long), broadly ovate and overlapping, on older branchlets (0.25 in. long). Cones 3-4 by 3.5-4.5 in. Seed 1.1-2 by 2.2-3 in.

A native of NORFOLK ISLAND. Sometimes cultivated.

2. PICEA Link.


A tall stately tree, reaching a height of 200 ft. and a girth of 20 ft. Bark greyish, shallowly furrowed, and with
orbicular or squarish scales. *Leaves* spirally arranged, 1-1·5 in. long, pungent, 4-sided with about 2 lines of stomata on each. *Male catkins* solitary, erect, 1 in. long. *Stamens* with 2-linear pollen sacs. *Cones* 4-7 by 1-2 in., pendulous, bright-green when young, brownish when ripe; scales persistent. *Seeds* about 1·2 in. long; wing spathulate, 1·5-6 in. long; cotyledons 5-8.

Cultivated in Shillong.

Ftrs. 4. Cones ripe 10-11.

3. **ABIES** Juss.

*Abies Webbiana* Lindl. The East Himalayan Silver fir.

An enormous lofty tree (150 200'/20-30'); branches pendulous. *Bark* dark-brown or greyish-black, deeply fissured. *Leaves* 1·5-2 in. long, distichous, needle-like, flattened, all round the branchlets. *Flowers* monoecious. *Male catkins* clustered; stamens with 2 linear pollen sacs. *Cones* erect; scales thin, breaking away from a persistent woody axis when ripe, fan-shaped, suddenly contracted to a short claw; ovules recurved in the axils. *Ripe cones* cylindric, thicker and shorter than *A. Pindrow* (4-7 by 1·5-3); wing 1½ times the length of the seed.

Ftrs. 4. Cones ripen in 9-10.

**BALIPARA FRONTIER TRACT** (Common on Piri mountains 10,000 ft.) (Dr. N. L. Bor).

**A. Delavayi**

A tall tree (60-100 ft. high); young shoots reddish-brown. *Leaves* about 1 in. long (arranged as in *A. Webbiana* but shorter) dark glossy-green and furrowed above; midrib prominent beneath with 2 broad white bands of stomata; margins somewhat revolute. *Cones* 3-4 in. long, barrel-shaped, dark violet-black; in ripe cone the apex of the scale is slightly exserted.

**BALIPARA FRONTIER TRACT,** Piri Mountain—10,000 ft. (Dr. N. L. Bor).

4. **PINUS** Linn.

Evergreen trees; branches whorled; shoots dimorphic (long and short). *Leaves* needle-like or scaly. *Flowers*
monœcious; perianth 0. Male catkin crowded at the base of the current year's shoots, numerous, each bearing 2 pollen sacs connected at the back by a scale-like connective which is produced in a membranous tip. Female flowers in cones, solitary or whorled; scales double; the lower (carpellary), small, disappearing in fruit; the upper (placental) bearing near its base 2 reversed ovules and becoming hard and woody in fruit. Ripe cones ovoid-oblong or cylindrical, formed from the imbricating woody or almost leathery placental scales. Seeds generally winged, oily; cotyledons more than 2.

Needles in bundles of 3:—
Leaves 6-10 in. long; cones ovoid, 2-3 in. long. 1. P. Khasya.
Leaves 9-15 in. long; cones ovoid, 4-8 in. long. 2. P. longifolia.

Needles in bundles of 5:—
Cones 6-12 in. long, cylindrical. .. 3. P. excelsa.


A tall gregarious tree (150'); branches whorled. Bark thick, deeply and reticulately cracked, coming off in thick small plates. Needles 6-10 in. long, slender, back convex; sheath persistent, grey, lacerated at apex. Cones ovoid, solitary or in twos or threes, 2-3 in. long, about 2 in. across (beak of scale depressed) pyramidal with a blunt knob at the end; wings four times the length of the seed.

MANIPUR, NAGA HILLS and K. & J. HILLS, (upto 6,000 ft.).
Principal building timber of Khasi and Jaintia Hills. The resin can be distilled into a high class turpentine. The highly resinous heartwood is an excellent torch wood.

Flrs. 2-3. Cones ripen in about 2 years, persist long on the trees.

2. Pinus longifolia Roxb.

A tall gregarious tree; branches whorled. Bark 1-2 in. thick, deeply fissured into large plates which fall off. Leaves 9-15 in. long, slender, obscurely triquetrous. Cones solitary or 3-5 together, ovoid. 4-8 in. by 3-5 in., on short stalks. Scales 1-2 by .7 in.; beak 4-6-gonous, reflexed, much thickened, usually with a somewhat recurved pointed tip. Seeds
KHASI & JAIN'TIA HILLS and NAGA HILLS, (4,500-8,500 ft.).
Flrs. 3-5. Mature fruit. 3-7 (following year).

2. Cephalotaxus Griffithii Hook. f.
A middle-sized tree; branches elongate. _Bark_ brownish, smooth. _Leaves_ 1-1.5 by 1-1.5 in., more or less falcate, sub-acute, patent or almost so; base partially inequilateral, truncately rotundate or partly sub-cordately incised, often attenuate, whitish beneath; midrib more prominent above. _Seeds_ 8-9 in. long, sometimes longer, born 3-4 together with a short apical point and narrowed at the base.

NORTH EAST FRONTIER TRACT, NAGA HILLS, MANIPUR & MISHMI HILLS, (5,000-6,000 ft.)

FAM. 134. PINACEÆ.

Trees or shrubs, mostly evergreen. _Leaves_ usually needle-like or scaly. _Flowers_ mostly monoeccious. _Male flowers_ in deciduous catkins consisting of numerous sporophylls which are usually scale-like and bears 2-6 (rarely less or more) pollen sacs on the lower surface. _Female flowers_ in cones consisting of scale-like open carpels which are flat or peltate and bear directly or on a subsidiary placental scale 1-many ovules. _Seeds_ concealed between scales of a perfect cone; testa woody or leathery (no aril).

The wood is without vessels. Resin canals are present. It consists of long thick-walled tracheids arranged in radial lines with large bordered pits.

Cones perfect. Seeds concealed between scales, no aril:

(i) Leaves spirally arranged; carpels simple with 1 reversed ovule in the centre. Seeds adherent to scales .. .. 1. _Araucaria._

(ii) Leaves spirally arranged; ovules reversed; scales of cones numerous, spirally arranged:
Pollen grains winged:—
Long shoots only present:—
Needles 4-angled. Cones pendulous; scale persistent. . .
Needles flat. Cones upright, scales deciduous. . . .
Long and short shoots both present:—
Long shoots with scaly leaves, short shoots with green needles.
Needles on both shoots. . .
Pollen grains not winged:—
Needles flat. Cones pendulous, scales persistent. . .

(iii) Leaves spirally arranged; ovules erect; scales rudimentary or weakly developed:—
Long shoots only present; carpels with toothed scale. . .

(iv) Leaves opposite or whorled, rarely alternate, often heterophyllous; ovules erect; scales of cones few:—
Cones woody when ripe; carpels peltate. Seeds with orbicular wing.
Cone baccate or drupacious. Seeds not winged. . .

6. Tsuga.

2. Picea.

3. Abies.

4. Pinus.

5. Cedrus.

7. Cryptomeria.

6. Tsuga.

(iv) Leaves opposite or whorled, rarely alternate, often heterophyllous; ovules erect; scales of cones few:—
Cones woody when ripe; carpels peltate. Seeds with orbicular wing.
Cone baccate or drupacious. Seeds not winged. . .


1. Araucaria Juss.

Araucaria excelsa R. Br. (Norfolk Island Pine).

A handsome tree with graceful feathery branches; main branches horizontal, whorled; lateral branchlets horizontal or pendulous; outer bark peeling off in thin flakes. Leaves dimorphic, needle-like, incurved, bright green on young or lateral branchlets (0.5 in. long), broadly ovate and overlapping, on older branchlets (0.25 in. long). Cones 3-4 by 3.5-4.5 in. Seed 1-1.2 by 0.2-0.3 in.

A native of NORFOLK ISLAND. Sometimes cultivated.

2. Picea Link.


A tall stately tree, reaching a height of 200 ft. and a girth of 20 ft. Bark greyish, shallowly furrowed, and with
orbicular or squarish scales. *Leaves* spirally arranged, 1.1 to 1.5 in. long, pungent, 4-sided with about 2 lines of stomata on each. *Male catkins* solitary, erect, 1 in. long. *Stamens* with 2-linear pollen sacs. *Cones* 4-7 by 1-2 in., pendulous, bright-green when young, brownish when ripe; scales persistent. *Seeds* about 0.2 in. long; wing spatulate, 0.5 to 0.6 in. long; cotyledons 5-8.

Cultivated in Shillong.

Flrs. 4. Cones ripe 10-11.

3. **ABIES** Juss.

*Abies Webbiana* Lindl. The East Himalayan Silver fir.

An enormous lofty tree (150 200'/20-30'); branches pendulous. *Bark* dark-brown or greyish-black, deeply fissured. *Leaves* 0.5-2 in. long, distichous, needle-like, flattened, all round the branchlets. *Flowers* monoecious. *Male catkins* clustered; stamens with 2 linear pollen sacs. *Cones* erect; scales thin, breaking away from a persistent woody axis when ripe, fan-shaped, suddenly contracted to a short claw; ovules recurved in the axils. *Ripe cones* cylindric, thicker and shorter than *A. Pindrow* (4-7 by 1.5-3); wing 1 1/2 times the length of the seed.

Flrs. 4. Cones ripen in 9-10.

**BALIPARA FRONTIER TRACT** (Common on Piri mountains 10,000 ft.) (Dr. N. L. Bor).

**A. Delavayi**

A tall tree (60-100 ft. high); young shoots reddish-brown. *Leaves* about 1 in. long (arranged as in *A. Webbiana* but shorter) dark glossy-green and furrowed above; midrib prominent beneath with 2 broad white bands of stomata; margins somewhat revolute. *Cones* 3-4 in. long, barrel-shaped, dark violet-black; in ripe cone the apex of the scale is slightly exserted.

**BALIPARA FRONTIER TRACT**, Piri Mountain—10,000 ft. (Dr. N. L. Bor).

4. **PINUS** Linn.

Evergreen trees; branches whorled; shoots dimorphic (long and short). *Leaves* needle-like or scaly. *Flowers*
monoeious; perianth 0. *Male catkin* crowded at the base of the current year's shoots, numerous, each bearing 2 pollen sacs connected at the back by a scale-like connective which is produced in a membranous tip. *Female flowers* in cones, solitary or whorled; scales double; the lower (carpellary), small, disappearing in fruit; the upper (placental) bearing near its base 2 reversed ovules and becoming hard and woody in fruit. *Ripe cones* ovoid-oblong or cylindrical, formed from the imbricating woody or almost leathery placental scales. *Seeds* generally winged, oily; cotyledons more than 2.

Needles in bundles of 3:—
- Leaves 6-10 in. long; cones ovoid, 2-3 in. long. 1. *P. Khasya*.
- Leaves 9-15 in. long; cones ovoid, 4-8 in. long. 2. *P. longifolia*.

Needles in bundles of 5:—
- Cones 6-12 in. long, cylindrical. 3. *P. excelsa*.


A tall gregarious tree (150'); branches whorled. *Bark* thick, deeply and reticulately cracked, coming off in thick small plates. *Needles* 6-10 in. long, slender, back convex; sheath persistent, grey, lacerated at apex. *Cones* ovoid, solitary or in twos or threes, 2-3 in. long, about 2 in. across (beak of scale depressed) pyramidal with a blunt knob at the end; wings four times the length of the seed.

MANIPUR, NAGA HILLS and K. & J. HILLS, (upto 6,000 ft.). Principal building timber of Khasi and Jaintia Hills. The resin can be distilled into a high class turpentine. The highly resinous heartwood is an excellent torch wood.

Flrs. 2-3. Cones ripen in about 2 years, persist long on the trees.

2. **Pinus longifolia** Roxb.

A tall gregarious tree; branches whorled. *Bark* 1-2 in. thick, deeply fissured into large plates which fall off. *Leaves* 9-15 in. long, slender, obscurely triquetrous. *Cones* solitary or 3-5 together, ovoid. 4-8 in. by 3-5 in., on short stalks. *Scales* 1-2 by .7 in.; beak 4-6-gonal, reflexed, much thickened, usually with a somewhat recurved pointed tip. *Seeds*
3.5 in. long; wing membranous, rather longer than the seed; cotyledons 12.

BALIPARA FRONTIER TRACT (2,000 ft.).

I came across a solitary tree in Saralbhanga block (Goalpara). The timber is extensively used for railway sleepers (creosoted). Turpentine and rosin are manufactured from the resin.

Flrs. 2-4. Fr. Ripen in October of next year (?). The cones remain long on the trees.

3. Pinus excelsa Wall.

A large tree. Bark smooth, slate-coloured, corky, with shallow fissures Needles 6-8 in. long, slender, bluish-green, triquetrous; sheaths entire, deciduous. Cones generally 2-3 together, 6-12 in. long, cylindrical; scales 2-2.5 by 1-1.5 in.,spathulate, tips not much thickened. Seeds blackish, acute, compressed, 25-35 in. long; wing about three times the length of the seed, obliquely truncate; cotyledons usually 9.

BALIPARA FRONTIER TRACT, (Tenga Valley and Apatenong Valley 4,000 ft. and above (Dr. N. L. Bor).

Economic uses similar to P. longifolia.

Flrs. 4-6. Fr. Ripen in 9-11 of the second year.

5. CEDRUS Link.

Cedrus Deodara Loud. The Himalayan Cedar. Deodar, Sans.

A large evergreen tree; branches not whorled; branches and branchlets horizontal; tips slender, nodding. Bark greyish-black or dark-brown, with vertical and diagonal fissures Leaves 1-1.5 in. long, acicular, triquetrous. Flowers usually monoecious; male catkins solitary at the ends of branchlets; stamens with 2 pollen sacs. Cones erect, 4-5 by 3-4 in., ovoid or pyramidal, obtuse; scales imbricate. Seeds 3-6 in. long. triangulae; wing 6.7 in. long; cotyledons usually about 10.

Cultivated in Shillong.

Best conifer-timber of Upper India, extremely durable. It is extensively used for building and railway sleepers. Deodar oil is extracted from the wood by destructive distillation and is used as a remedy for ulcers and eruptions.
There is a section in the Forest Research Institute, Dehra Dun; 27 ft. in girth, age of which is calculated to be 900 years.

Flrs. 9-10. Cones ripen in 10-11 of the following year.

6. TSUGA Carr.

Tsuga Bruneiana Carr.

A tall tree, attaining 120 ft.; branches spreading; branchlets pendulous. Leaves distichous, 5-1 in. long, white-mealy beneath. Cones ovoid, 5-75 in. long; scales broadly elliptic, obtuse; supporting scales not projecting in the mature cone; wing 3/rd the length of the scale.

BALIPARA FRONTIER TRACT. Fairly common on Piri Mountains 10,700 ft. (Dr. N. L. Bor). Also cultivated.

Flrs. 5-6. Fr. Cold weather of same year (Indian trees P. 693).

7. CRYPTOMERIA D. Don.

Cryptomeria japonica Don.

A stately fast-growing evergreen tree (about 120' in height); crown narrow, conical; heart-wood dark, reddish brown, fragrant. Leaves falcate, subulate, ascending, pointed on all directions, free portion about 5 in. long, the lower edge decurrent. Flowers monœcious. Male catkins clustered at the ends of branchlets; pollen sacs 3-5 at the base of scales. Cones globose, at the ends of branchlets; ovules erect, 2, at the base of scales. Ripe cones 6-2 in. long, broadly ovoid; scales woody, pectinate and persistent after the fall of the seeds. Seeds compressed, angular.

Indigenous to JAPAN & CHINA.

Cultivated in K. & J. HILLS, (4-5000 ft.), NAGA HILLS & MANIPUR.

8. CUPRESSUS Linn.

Evergreen shrubs or trees; branches whorled. Leaves small, scale-like, closely adpressed, opposite, mostly imbricate. Flowers monœcious at the ends of short branchlets. Male catkins numerous, cylindric, solitary at the tips of the branchlets; stamens peltate, stipitate, bearing on the lower edge 2-6 globose pollen sacs. Female flowers in cone of
3-12; scales decussate, peltate; the middle ones bearing above their base 2 to many erect ovules. *Cone* globose, woody. *Seeds* small, compressed or angular, winged; cotyledons 2-4.

Branchlets drooping, forming a broad pyramidal crown:—
Branchlets are not rough to the touch. ... 1. *C. torulosa*.
Branchlets pendulous spreading in the same plane:—
Branchlets are rough to the touch. ... 2. *C. funebris*.

1. **Cupressus torulosa** D. Don.

A large evergreen tree; branchlets drooping. *Bark* greyish-brown, peeling off in long thin strips. *Leaves* 0.05 in. long, small, scale-like, closely adpressed, opposite in pairs, imbricate, triangular. *Flowers* monœcious. *Male catkins* numerous, solitary at the tips of the branchlets, ovoid, small; stamens peltate, stipitate, bearing on the lower edge 2-6 globose pollen sacs. *Female flowers* in cones consisting of 6-10 decussate peltate scales; the middle scales bearing 4-6 erect ovules at the base. *Ripe cones* globose, clustered. 0.5-0.7 in. across; scales woody. *Seeds* compressed, 0.2 in. across including the orbicular wing; cotyledons 2-3.

BALIPARA FRONTIER TRACT, Tenga Valley 6-8,000 ft. (Dr.-N. L. Bor). Cultivated in Shillong.


2. **Cupressus funebris** Endl. The Chinese weeping Cypress.

A medium-sized handsome tree; branches pendulous. *Leaves* closely pressed, free and pointed at the apex. *Male catkins* 1 in. long. *Ripe cone* 0.3-0.7 in. in across. *Seed* small-winged.

Cultivated in Shillong.

9. **JUNIPERUS** Linn.

Shrubs or trees, aromatic, heart-wood distinct, generally red. *Leaves* often glandular at back, all linear or subulate, in whorls of 3 or scale-like, opposite in pairs on young shoots vigorous subulate and spreading. *Flowers* monœcious...
or dioecious. Male catkins small, cylindric or ovoid; stamens decussate or in threes; connective enlarged, ovate or peltate at the apex, bearing, 2-6 globose pollen sacs at the base. Female flowers in cones consisting of 2-6 opposite or terminal scales (lower sterile); ovules 1-2 to each fertile scale, upright. Cone berry-like, more or less succulent. Seeds one or more, hard, bony, not winged; cotyledons 2-6.

Leaves pungent, all linear. Cone 1 seeded, ovoid. . . . . . . 1. J. recurva.
Leaves dimorphous, mostly scale-like. Cone 2-5 seeded, globose. . . . . . . 2. J. macropoda.

1. **Juniperus recurva** Buch-Ham.

A gregarious shrub. Bark reddish, exfoliating in thin strips. Leaves 1-2 in. long, more or less adpressed, in whorls of 3, lanceolate, sharply pointed, ascending, loosely imbricated; back convex. Male catkins berry-like. Cones at ends of short lateral leafy branchlets. Fruit ovoid, 3-5 in. long, pointed, shining, dark-brown or blackish purple when ripe. Seed 1, oblong.

MISHMI HILLS, 9,000 ft. (Sheet No. 7669).
Flrs. 6-7. Ripe fruit 7-10 (following year).

2. **Juniperus macropoda** Boiss.

A small or middle-sized tree. Bark reddish-brown, fibrous, vertically fissured, exfoliating in strips. Leaves dimorphous, subulate and pungent on young shoots, scale-like on mature branches, closely adpressed with a large resinous glands on the back. Flowers monoeious. Male catkins at the ends of branchlets. Fruit almost globose, 3 in. across, blue-black when ripe, very resinous; the tips of the scales forming transverse ridges. Seeds 2-4.

MANIPUR (Political Agent 1914, probably introduced).
Flrs. 5. Fr. 10.
FAM. 135. CYCADACEÆ.

Shrubs or trees, trunk cylindric, sometimes forked, in appearance and habit like tree ferns. *Leaves* in a terminal crown or arising from a stemless simple or branched rhizomes. *Leaves* are usually of 2 sorts, foliage and scale leaves, borne spirally upon the stem and alternate with one over another and as a rule several such of scaly leaves before each circle of foliage. *Foliage* leaves palm-like, pinnati-partite with thickened woody more or less sheathing base which often persists after the fall of the remaining part of the leaf; segments of leaves entire or toothed, usually very rigid and leathery. *Flowers* dioecious and usually take the form of cones. *Male flowers* in one or more terminal cones, composed of numerous fleshy flat or variously peltate scales crowded beneath with numerous anther-cells upon the lower side arranged with lines of dehiscence radiating from the centre. *Female carpophylls* in cones or in crowded whorls round the apex of the stem (*Cycas*) each bearing as a rule only 2 ovules; ovules large, orthotropous, with one integument. *Seeds* large, drupe-like; endosperm copious; radicle superior, attached to a long suspensory cord; cotyledons 2.

**CYCAS** Linn.

Shrubs or trees with a simple or rarely branched, cylindric caudex clothed with the woody bases of the sheathing leaves which are rigid and leathery. *Leaves* pinnati-partite; segments linear, involute in vernation; the rachis (petiole) short, frequently thorny at the base (metamorphosed segments of leaves). *Male cones* closely imbricated and usually prolonged in long acumen; female no proper cone. *Carpophylls* densely woolly, numerous, in crowded whorls round the apex of the stem, adpressed in an apparently terminal cone then spreading, elongate, flattened, dilated above into an entire crenate or pectinate blade. *Ovules* 1-5 in notches on either side of the carpophyll-stalk, distant. *Seeds* ellipsoid or globose.
Margins of leaf segments flat:—
Carpophyll blade almost orbicular, pectinate. 1. *C. pectinata*.
Margins of leaf segments revolute:—
Carpophyll blade ovate-lanceolate. 2. *C. revoluta*.


An evergreen small palm-like tree (upto 22'), glabrous, sometimes forked. *Leaves* 4-7 ft. long; segments 6-10 by 2-4 in.; rachis (petiole) about 18 in. long, with a few distant thorns near the base; base more or less sheathing. *Male cone* about 18 in. by 6 in.; antheriferous scales about 1.5 by 1 in. *Carpophylls* 6 in. long, densely twany silky; blade almost orbicular, 3 in. across, cut into subulate pectinate spiny teeth (5-8 in. long), terminating in a strong subulate acumen (1 in. long); stalk about as long as the blade. *Ovules* 2-3 pairs, glabrous. *Seeds* ovoid, glabrous, 1.5-2 in. long, orange or yellowish orange.

GOALPARA, KAMRUP, MANIPUR and K. & J. HILLS, (2,000 ft.).

Young shoots used as vegetable (Goalpara). The fleshy stem is pounded and used as a hair wash for diseased root hairs (Kamrup).

Flrs. 5.

2. **Cycas revoluta** Thunb.

A more dwarfy species. *Leaves* 2-6 ft. long; segments revolute. *Carpophylls* 4-9 in. long, ovate, laciniate; stalk longer than blade.

Native of JAPAN commonly cultivated in gardens of Shillong.
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OF

FAMILIES, GENERA AND SPECIES.

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