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FLORA OF ASSAM

BY

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AND

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VOL. IV.

NYCTAGINACEÆ TO CYCADACEÆ



Published under the authority of the Government of Assam.

Price Rs. 10/-

First correction slip to "Flora of Assam Vol. IV."

P. 156 Read - Roidia tetrandra (Roxb) *M. V. Narayanswami*, n. comb. Mss., in place of "Roidia tetrandre (Roxb) *A. Das*, n. comb."

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

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

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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, Gramineæ 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 & Coniferœ) 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 *Lauraceœ* 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,
The 24th February, 1940.

A. Das.

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.*
4. Machilus dubia *Das and Kanjilal.*
5. Purkayasthæa pseudo-microcarpa *Purk. and Narayanswami.*
6. Excœcaria Sp. Nov. *Das.*
7. Quercus *Milroyii Purk.*

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

Machilus dubia and Excœcaria 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 *Purkayasthœa* (Lauraceæ) established by Mr. C. S. Purkayastha and Mr. Narayanswami also finds its proper place.

Hernandiaceæ has been put under Calycifloreæ by some botanists but its position under Apetaleæ 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 Hyphear, Helixanthera, Scurrula, Taxillus, Dendropthœ, Tolypanthus and Macroselon 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 Gnetums, I have followed Dr. Fr. Markgraf (Monographie der Gottung Gnemon in Bulletin Jard. Bot. Buitenzorg, sec. III. Vol. X, Levr. 4, 1930).

In describing the Conifers I have followed the classification adopted in the "Handbook of Coniferœ" (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.

Royal Botanic Garden, Calcutta,
The 24th February, 1940.

A. Das.

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 :—

Bœrhaavia diffusa *Linn.* Syn. B. repens Linn. Var. diffusa and procumbens Hk. f. in F.B.I. *Punarnava. Shothaghni,* Sans. Vern. *Punarnava,* Beng.

A diffuse herb with stout fusiform roots; stems ascending or prostrate, divaricate, thickened at the nodes. *Leaves* in unequal pairs, the larger ·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, upto 10 together, sub-capitately arranged on long peduncled dichotomously branched panicles; pedicels capillary; bracts small. *Perianth* about ·12 in. long, glandular outside; limb funnel-shapped 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 immemorial and is indicated for the treatment of dropsy, jaundice, urino-genital diseases. The tender leaves are eaten as pot herb.

Flrs. 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 ·5 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.

Mirabilis jalapa *Linn.* The Marvel of Peru. Vern. *Krishna-kali, Sarpamani,* Beng.

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.

FAM. 104. AMARANTACEÆ.

Herbs, rarely shrubs or undershrubs, erect or climbing (rarely). *Leaves* opposite or alternate, exstipulate. *Flowers* usually 2-sexual, rarely polygamous or dicœcious, 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 panicled spikes. Sepals scarious tipped with wool.	5.	**Stilbanthus.**

1. DEERINGIA R. Br.

Deeringia amranthoides (*Ham*) *Merr*=Deeringia celosioides R. Br. Vern *Monbir*. Mech; *Handing*. Mik.; *Madhu-holong, Mathukthuka, Rangoli-lota, Man-mani*, Ass.; *Soh-lang-krem*, Kh.; *Ako-ligbo-riube*, Abor; *On-ligbo-riube*, Miri; *Midoubri-doukha*, Cach.; *Mei-hur-jarem, Mei-soh-jarem*, Khasi.

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 panicled 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. ÆRUA Forsk.

Ærua 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.

Cyathula tomentosa *Moq.* Vern. *Soh-pyrtit,* Synt.

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 ·5-·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, ·1-·15 in. long. *Perianth* segments of perfect flowers about ·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, upto ·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 Molucca).

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.*

1. Achyranthes aspera *Linn.* Vern. *Apamarga*, Sans.; *Champang-michel*, Garo: *Sam-songi*, Cach.: *Chik-kai-rek*, Kuki; *Non-phak-pe*, Mik.; *Soh-byrthied*, Kh.; *Ulti-hot*, Ass.; *Apang*, Beng.; *Chit-chita*, Hind.

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-obovate 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 ·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 ·15 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.

Flrs. 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 upto ·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.
Flrs. 6-10. Fr. 7-12.

A. aquatica *Br.*

A stout aquatic herb. *Leaves* 2-6 in. long, narrow to elliptic-lanceolate, strigosely 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).
Flrs. 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.

Amaranthus gangeticus *Linn.* Vern. *Moricha-hag,* Ass.; *Note-shak, Dengua-shak,* Beng.; *Chaulai, Marsa, Chua,* Hind.

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.

A. spinosus *Linn.* Vern. *Kanta-natia,* Beng.; *Kanta-maricha.* Ass.; *Tanduliya,* Sans.

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 efficaceous remedy in diarrhœa.

Var. cristata. Syn. C. cristata Linn. Cock's comb., Vern. *Moragphul,* Beng.

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 diarrhœa 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.

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 intravening 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 JAINTIA 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.

Spinacia oleracea *Linn.* Spinach. Vern. *Palang*, Beng.; *Mithapalang*, Ass.; *Palak*, Hind.

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

Often cultivated in gardens.

Atriplex hortensis *Linn.* Orache. Mountain spinach. Vern. *Paharipalang*, Beng., Ass. & Hind.

A stout erect annual with glabrous striate stems. *Leaves* upto about 2·5 in. long, ovate or upper triangular, obtuse. *Flowers* monœcious; 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.

Basella rubra *Linn.* Vern. *Pui*, Beng. & Ass.; *Poi*, Hind.

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 subacute, 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, panicled 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 sepals, 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. *Jaiong,* 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 gonous or biconvex; styles 1-3; stigmas various, usually capitellate; ovule 1, orthotropous; but hard, usually 3-(rarely 4-) gonous or biconvex, usually included in the perianth. *Seed* erect with membranous testa and floury or sometimes miniate albumen. *Radicle* superior.

Perianth segments 3-5; stigmas capitellate :— 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 capitellate. *Nut* included in the more or less accrescent perianth or slightly extruded, biconvex or trigonous, brown or black usually polished.

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 corymbosely 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 root stock. .. .. *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.*

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, 1-7 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, ·08 in. long.

Nongstoin, 5,000 ft. KHASI and JAINTIA 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. Fr. 10-1.

4. Polygonum paleaceum *Wall.* Vern. *Lang-wa-rai*, Khasi.

A scapigerous perennial with stout rootstock about ·6 in. across. *Cauline* 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 upto ·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.

5. Polygonum chinense *Linn.* Vern. *Kel-nap*, Kuki.

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, upto ·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 corymbosely or in panicles; peduncles hispidulous or glandular, specially near the flower heads or sometimes glabrate upto ·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 ·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* ·5-1·5 by ·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 capitate heads, ·25-·5 in. across; peduncle 1-3 together, ·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 ·25-·3 in. across in axillary or subterminal, glabrous, slender peduncles. *Perianth* 5-cleft; stamens 8. *Styles* 2-3, connate below. *Nut* 3-gonous.

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

Flrs. 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.*

Flrs. & Fr. 8-10.

9. Polygonum rude *Meissn.* Vern. *Ja-long-noh,* Khasi.

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.

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

10. Polygonum molle *Don.* Vern. *Ja-ryndem*, Synt.

A subscandent 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-villous, 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.

Flrs. 5-8. Fr. 10-11.

11. Polygonum perfoliatum *Linn.* Vern. *Ma-seinthli*, Khasi.

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 ·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 upto 5,000 ft. SIBSAGAR, SYLHET—*Wallich*, probably in other districts as well.

Flrs. & Fr. 7-10.

P. arifolium *Linn.*

Herbaceous; stem slender, flaccid. *Leaves* 2·2·5 by ·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.)

Flrs. 8.

P. prætermissum *Hk. f.*

A small glabrous herb. *Leaves* 1-2 by ·3-·4 in., linear-oblong, bluntly acuminate, sagittate, glabrous; petiole about ·5 in. long. *Stamens* 5. *Nut* puncticulate.

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

Flrs. 5.

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

A stoloniferous rather pubescent perennial. *Leaves* 2-5 by 1-2·3 in., elliptic or lanceolate, acuminate, pubescent, membranous (clothed with fulvous tomentose beneath?); lateral nerves fine, about 20 on either half; base rounded, slightly oblique; petiole about ·2-·4 in. long. *Flowers* in terminal cymes. *Perianth* campanulate. *Stamens* 8. *Nut* pale.

NAGA HILLS (10,000 ft.)

Flrs. & 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. *lapathifolium Linn.*, P. macranthum *Meissn.*, P. Meeboldii *W. W. Smith.*, P. minus *Huds.*, 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 Gærtn.

Fagopyrum cymosum *Meissn.* Vern. *Ja-rain*, Khasi.

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.

Flrs. 7-11.

F. esculentum *Mœnch.* The buckwheat. Vern. *Jarain*, Kh.; *Phapar*, Nep.

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.

R. vesicarius *Linn.* Vern. *Chuk-palang*, Beng., Ass.; *Chooka*, Hind., Bladder dock.

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* monœcious; 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 ·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.

KHASI HILLS, (3,000 ft.). (No specimen in Forest Herbarium, Shillong). (F.B.I., P. 63, Vol. V).

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.

KHASI HILLS (Wallich, Griffith). (No specimen in Forest Herbarium, Shillong). (F.B.I., P. 67, Vol. V).

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 scandent, 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* diœcious, 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.

Nepenthes khasiana *Hk.f.* Vern. *Tiew-rakot* (Demon flower), Khasi.

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.

Flrs. 6. Fr. 9-10.

FAM. 110. CYTINACEÆ (Rafflesiaceæ).

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.*

Diœcious. *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.

KHASI HILLS, N.-E. F. TRACT, (L. H. Burkill's No. 37,556). BALIPARA FRONTIER TRACT (N. L. Bor). (F.B.I.P. 71).

Flrs. 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.*

1. Aristolochia Tagala *Cham.* Syn. **Aristolochia Roxburghiana** Klotz. Vern. *Chohu,* Mik.; *Panpipuli. Belikol,* Ass.

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.

Flrs. 4-6. Fr. 11-1.

2. Aristolochia platanifolia *Duchart.* Vern. *Durgup-bipha,* Garo.

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. 4-6.

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 ·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.

Flrs. 8-3. Fr. 5.

Apama tomentosa (*Bl.*) *Chatterjee Comb. Nov. Mss.* Syn. Bragantia tomentosa Bl.

A herbaceous undershrub; stem creeping below and rooting, angular. *Leaves* 4-6 by 2·5-4 in.; base 6-9 nerved. *Flowers* ·5-·8 in. across; bracts persistent. *Perianth* lobes acute, cordate. *Stamens* 1-seriate. *Ovary* linear. *Capsule* 2 in. long; seeds trigonous, rugose.

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

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

Flrs. 7.

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, indihescent.	**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, dicœcious 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 :—
          Leaves rounded, ovate, 7-nerved (base). .. .. 4. *P. petiolatum.*
        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. bœhmeriæfolium.*
      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. .. 9. *P. Thomsoni.*

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. .. .. 13. *P. attenuatum.*

1. Piper Griffithii *Cas DC.* Vern. *Miti-horong-doukha,* 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.

2. Piper longum *Linn.* Vern. *Pipul, Piplu,* Ass.; *Ethipokang-arong,* Mik.

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* dicœcious; 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* dicœcious, male spikes slender; bracts peltate. *Fruiting* spike dense, cylindric, about 1 in. long; peduncle ·3-·4 in. *Fruit* very small, ·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).

5. Piper Betle *Linn.* Vern. *Pan,* Beng.; *Tambul,* Ass.

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 bœhmeriæfolium *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. officinanum 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* dicœcious; 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.

11. Piper khasianum *Cas. DC.* Vern. *Mei-soh-maken-newrai, Mei-soh-mrit-khlow,* Kh.

A glabrous shrub, winding clock-wise; stem glabrous. *Leaves* 2-4 by ·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 ·1-·3 in. long. *Flowers* dioecious. *Fruiting* spikes loose, interrupted, about 1·5 in. long; peduncle about ·6 in. long. *Fruits* globose, ·25 in. in diameter. *Seed* white, aril light brown.

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

Fr. 4.

12. Piper nigrum *Linn.* Vern. *Gol-morich, Kalu-morich,* Beng.

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 ·2-·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, upto 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 ·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, ·16 in. across.

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

P. diffusum *Vahl.* Vern. *Soh-myrit,* Kh.

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 JAINTIA HILLS, (upto 6,000 ft.).
Fr. Cold season.

P. sylvaticum *Roxb.* Vern. *Pahari-pipul,* Ass.

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 JAINTIA 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 :—

Piper anisotis *Hk. f.*, **P. Clarkeii** *C. DC.*, **P. Lonchites** *R. & Sch.*, **P. Listeri** *DC.*, **P. muneyporense** *DC.*, **P. nagaense** *C. DC.*, **P. nepalense** *Miq.*, **P. rhytidocarpum** *Hk. f.* and **P. Schmidtii** *Hk. f.*

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 ·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* 1 or 3, confluent, if 3, central anther 2-celled, the laterals 1-celled. *Ovary* naked; stigma subsessile, 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 ·05-·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.

2. Chloranthus brachystachyus *Bl.* Vern. *Tiw-kiba-khabor, Tiew-pathai-khobor*, Khasi; *Jakhi*, Synt.

A shrub, about 8 ft. high, woody, growing in intense shade. *Leaves* 1-6·5 by ·5-3 in., elliptic or elliptic-lanceolate, acuminate, coarsely and deeply glandular-serrate, membranous; petiole about ·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 dicœcious, 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* laciniate 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 :—
  Arils laciniate to the base. .. 1. *M. laurifolia.*

II. Flowers small, globose; anthers 12-30; stigma minute, sessile :—
  Arils not frequently laciniate; bracteoles 0; staminal column sessile :—
    Panicles more or less tomentose; aril entire. .. .. 2. *M. Kingii.*
    Panicles glabrous; aril laciniate at the apex. .. .. .. 3. *M. amygdalina.*

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 :—
  Male flowers more than ·16 in. across :—
    Young parts densely brown tomentose :—
      Fruit often solitary, 1·5 in. long. .. 4. *M. linifolia.*
    Young parts sparsely hairy :—
      Fruit not solitary (2-3), ·75 in. long. .. .. .. 5. *M. angustifolia.*
  Male flowers less than ·16 in. across :—
    Branchlets hoary :—
      Leaves narrow-oblong :—
        Fruit ovoid or globose. .. 6. *M. glaucescens.*
    Branchlets glabrous :—
      Leaves linear-lanceolate :—
        Fruit oblong, gibbous at base. .. 7. *M. gibbosa.*

1. Myristica laurifolia *Hk.f.* Vern. *Jaiphal,* Beng.

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 ·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 laciniate segments almost enclosing the seed

KHASI HILLS.

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

2. Myristica Kingii *Hk.f.* Vern. *Amol*, Ass.; *Mijingikum-asing*, Miri; *Pandikachoa-phang*, Kach.; *Siltui*, Lushai; *Bolong*, *Bolouchi*, Garo.

A tree (70′/55″); young shoots pubescent. *Bark* grey or brownish, somewhat rough outside with shallow vertical furrows exfoliating in square flakes, ·25 in. thick, reddish inside with streaks of lighter tissue, ·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-obovate or oblanceolate, acute or bluntly acuminate, coriaceous, glabrous; lateral nerves 10-18 on either half; base cuneate or rounded; petiole ·3-·5 in. long. *Perianth* ·12-·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.

3. Myristica amygdalina *Wall.* Vern. *Dieng-soh-jodao*, *Dieng-ja-lyntep*, Khasi; *Pakna-kala*, Cach.; *Bolchok-pok*, Garo; *Dettakarong*, *Pran-dang-arong*, Mik.; *Ching-liang-pai*, Naga.

A tall tree (65′/72″), glabrous. *Bark* brown, rough outside, slightly split vertically, ·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-chi*, Lushai; *Garo-bhala*, Ass.; *Dieng-soh-langor-shri*, *Dieng-soh-slung*, *Dieng-tyrkhou*, Kh.; *Chekulo-arong*, Mik.; *Duing-kim-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.

5. Myristica angustifoila *Roxb.*=Myristica erratica Hk. f.=Myristica longifolia Wall. Var. erratica F.B.I. Vern. *Tezranga, Mamui, Mota-pasuti,* Ass.; *Bol-lanchi,* Garo; *Bonsigejao,* Kach.; *Dieng-soh-lang-snam,* Khasi; *Chekpulu-arong,* Mik.; *Indung,* Tipp.

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.

Flrs. 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).

FAM. 115. LAURACEÆ

Erect, aromatic trees or shrubs, rarely leafless twinning parasites, mostly evergreen. *Leaves* alternate, exstipulate, 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 diœcious, 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 introrse :—
Flowers usually dicœcious :—
Anthers 4-celled; fertile stamens 9 or more :—
Bracts imbricate, deciduous :—
Leaves sub-whorled. .. .. **9. Actinodaphne.**
Bracts whorled, (involucrate), persistent :—
Leaves alternate ir 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 introrse, 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. CRYPTOCARYA 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, introrse, 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 Valeton (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.*

1. Cryptocarya amygdalina *Nees.* Vern. *Bonsum, Bonjolukia, Kharika-chapa, Bonhon-alu,* Ass.; *Pumrong-asing,* Miri; *Mugachala-buphang,* Kach.; *Sutrong,* Cach.; *Tundur,* Manip.; *Kalak-thiang,* Naga; *Nami-aga, Dalgappa,* Garo.

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.

Flrs. 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.

2. Cryptocarya Andersoni *King.* Vern. *Bon-honwalu, Daukhi-poma,* Ass.; *Bol-dujong, Boludom, Waksiring Boljadong, Bolkhumchhari, Bolong-bolanchi;* Garo; *Bon-dau-iongphang,* Kach.

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 subparallel; 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 ·15 in. across and about ·12 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.

LAKHIMPUR, KHASI HILLS, upto 2,700 ft. GARO 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, panicled 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-obovoid, apiculate; terminal buds ovoid.	*4. B. Gammieana.*

1. Beilschmiedia Roxburghiana *Nees.* Vern. *Thenglokso-arong, Chelaban-arong,* Mik.; *Dieng-soh-long-ar-khlaw,* Khasi.

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.

2. Beilschmiedia Brandisii *Hook.f.* Vern. *Bangla*, Mech; *Leluk, Bonhualu, Harupadrai*, Ass.; *Dieng-soh-khyllam-bam-skei*, Khasi; *Theng-lokso-arong*, Mik.

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

ovate, rounded or obtuse, pubescent outside. *Ovary* glabrous. *Anthers* glabrous. *Fruit* baccate, 2-2·5 in. long by ·8-1 in. across, oblong, glabrous, blue-black when ripe; fruiting peduncles stout.

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

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

3. Beilschmiedia assamica *Meissn.* Vern. *Tagong-asing*, Miri & Abor; *Gurgum-datki*, Miri; *Malaisi*, Mishmi; *Dhosra*, Nep.; *Naga-sutrong*, Sylh.; *Vamum-sappar*, Tipp.; *Amchoi, Kanthalpatia*, Ass.; *Sangtemchange* Duff.; *Horganme*, Garo; *Dieng-kha-lang*, Kh.

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, ·3-·5 in. thick; blaze soft, reddish brown or brown, turning deep brown on exposure; all parts glabrous; terminal buds lanceolate upto ·5 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 ·4-·7 in. long. *Panicles* usually shorter than the leaves, rarely longer, glabrous. *Flowers* not seen. *Fruit* 1-1·7 by ·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.

Flrs. buds. 12. Fr. 2-3.

4. Beilschmiedia Gammieana *King.* Vern. *Dieng-la-pylleng*, Kh.

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, narrowdly 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. *1. C. Tamala.*
Leaves 6-12 in. long, thickly coriaceous :—
Panicles usually exceeding the leaves. .. .. .. *2. C. obtusifolium.*
Buds and young shoots glabrous :—
Leaves ovate, 2·4·5 in. long :—
Panicles few flowered. .. .. *3. C. pauciflorum.*
Leaves alternate :—
Leaves orbicular or elliptic, 2·5-4·5 in., caudate-acuminate, 3-5-nerved :—
Flowers in few flowered short cymes. .. *4. C. caudatum.*
Leaves lanceolate, 3-6 in. long, 3-nerved :—
Flowers in long panicles. .. .. *5. C. cacharensis.*
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. .. .. *6. C. Cecicodaphne.*
Panicles few flowered, nearly glabrous :—
Fruit obovoid, about 1 in. long. .. *7. C. glanduliferum.*
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. .. .. *8. C. Camphora.*
Panicles glabrous or nearly so :—
Leaves 2·5-7 in. long :—
Fruit globose, ·5-·7 in. long; seated on the expanded perianth cup. .. .. *9. C. Parthenoxylon.*

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

1. Cinnamomum Tamala *Fr. Nees.* Vern. *Jonkeng-asing, Rapi-asing,* Abor; *Diend-la-tyrpat, Dieng-myrao-kasla-tyrdop, Dieng-sia-sia,* Kh., *Huara, Tejpata,* Sylh.; *Tarpalai-king,* Tipp.; *Tejpat or Teji-bol,* Garo; *Tej-pat,* Ass.

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.*

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

2. Cinnamomum obtusifolium *Nees.* Vern. *Chhame-jam* or *Chhamejong, Sami-jang,* Garo; *Dieng-la-si-sirmot, Dieng-la-tyrdop, Dieng-lassi, Dieng-pathi,* Kh.; *Pati-hunda, Paderai, Naga-dal-chini,* Ass.; *Dhupati-jola,* Mech; *Luteron, Theng-kichi-arong, Theng-kiching-alo,* Mik.; *Seerang-asing,* Miri; *Barbak-changne,* Duff.; *Laimakhau-buphang,* Kach.

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, ·5-·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 ·5 in. long, usually hoary with silky pubescence. *Perianth* about ·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* ·3-·5 in. long, ellipsoid or subglobose, seated on the slighly 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.

3. Cinnamomum pauciflorum *Nees.* Vern. *Barhil-chuon*, Kuki; *Diend-torthia*, Kh.

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* 2-4·5 by ·7-1·75 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 ·2-·4 in. long. *Peduncle* with 3 flowers; pedicels ·25 in. long, minutely pubescent or puberulous. *Perianth* ·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 ·3 in. across(?) often insect aattacked, seated on the truncate toothed accrescent base of the perianth.

KHASI HILLS 4-6,000 ft., CACHAR HILLS, Sonai Reserve.

Flrs. 5. Fr. 9.

4. Cinnamomum caudatum *Nees.* Vern. *Sasing-jola*, Kach.; *Dieng-la-pasiang*, Kh.; *Thengi-ching-alu-arong*, Mik.

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 nerved; base acute or cuneate, sometimes oblique; tertiaries fine, sub-parallel; petiole slender, ·3-·4 in. long. *Flowers* minute, ·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, GARO HILLS, KHASI & JAINTIA HILLS—upto 3,000 ft.

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

5. Cinnamomum cacharensis *R. N. Parker.* Vern. *Tezzia,* Cach. C. impressinervium Meissn.

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 ·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).

6. Cinnamomum Cecicodaphne *Meissn.* Vern. *Molahagori, Mala-giri,* Nep.; *Suri-arong, Korn-arong, Ok-hi-sissing,* Mik.; *Kanhuroi,* Synt.; *Diend-ping-wait, Dieng-jape* (below Lyng-kerdem), *Lanyar-iong, Dieng-pynwai,* Kh.; *Gonsorai,* Ass.; *Gondroi-phang, Konthuri-baphang, Bon-*

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

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.

7. Cinnamomum glanduliferum *Meissn.* Vern. *Gonsarai*, *Gonhorai*, Ass.; *Agrun-asing*, Miri; *Gonhorai-arong*, Mik.; *Yero-asing*, Abor; *Dieng-sing*, *Dieng-puin-waith*, Kh.; *Diend-salu*, Synt.; *Gonsalu*, Garo.

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.

Flrs. 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-shapped 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 glaucescent and minutely rusty puberulous beneath :—
  Leaves 5-10 in. long, sub-coriaceous. .. 3. *A. Keenani.*

1. Alseodaphne petiolaris *Hk. f.* Vern. *Dieng-soh-pydem*, Khasi; *Mekhai*, Lakhimpur; *Theng-bo-mom*, Mik.; *Labong-kroth-arong*, Mik.; *Balong*, Garo.

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.

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

2. Alseodaphne Owdenii *Parker.* Vern. *Jatisundi, Tilsundi,* Cachar, Sylh.

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 ·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-·4 in. long, ellipsoid, green; fruiting pedicel thickened, about ·4 in. long. *Fruits* blue-black when ripe.

CACHAR, J. S. Owden, (U. N. Kanjilal's No. 5694).

Timber of good quality, much valued in Surma Valley.

Flrs. 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, ·08 in. long. *Perianth* segments ovate, stellately puberulous; 3 outer ·6-·08 in. long, 3-nerved; 3 inner ·08-·1 in. long, 5-nerved, caducous in fruit. *Stamens* in 1st and 2nd series oblong; anther glabrous, glandulose-punctate; filaments villous, ·04 in. long; in 3rd series outer anthers rectangular,

glandular punctate; filaments shortly villous, glands subglabrous, 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, oblong-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.

7. MACHILUS Nees.

Evergreen trees: leaf buds lanceolate; buds of the inflorescence with imbricate scales. *Leaves* alternate, penni-nerved. *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.*

1. Machilus odoratissima *Nees.* Vern. *Dieng la-ngiar-iong,* Kh.

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, oblanceolate, 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-oblong; 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*.

Flrs. 3-4. Fr. 5-6.

2. Machilus parviflora *Meissn.* Vern. *Dieng-rang, La-niar-iong, Dieng-kanyar, Dieng-niar-um*, Kh.; *Dieng-satler*, Synt.; *Teu-ma-ching*, Naga.

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.

Flrs. 9. Fr. 2.

3. Machilus villosa *Hk. f.* Vern. *Bondai-sum, Sum*, Ass.; *Jai-khlong*, Mech; *Theng-bu-frok*, Mik.; *Ban-gel, Boldak-sra*, Garo.

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.

Flrs. 12-3. Fr. 5.

4. Machilus edulis *King.*

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.

Flrs. 5. Fr. 2.

5. Machilus bombycina *King.* Vern. *Artucheknan,* Mik.; *Mojili,* Mech; *Som,* Ass.

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, oblong-lanceolate 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 ·35 in. long, silky. *Flowers* about ·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, ·25-·3 in. across.

Throughout the province—natural and cultivated, ascending to an elevation about 1,500 ft. in the KHASI & JAINTIA HILLS.

Muga silk worms are reared on the tree.

Flrs. 12-2. Fr. 3-4.

6. Machilus Gamblei *King.* Vern. *Mojli,* Ass.; *Ong-that,* Garo.

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 ·75 in. thick; young parts silky-pubescent. *Leaves* 2·5-6 by ·7-2·2 in., variable, obovate-oblong, oblanceolate 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 ·3-1 in. long, slender, glabrous or pubescent. *Flowers* yellowish-green, about ·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 ·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* ·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.

Machilus khasyana *Meissn.* Vern. *Dieng-la-tam-sreng,* Kh.

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., oblanceolate 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.

Flrs. 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 oblanceolate, 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.*

Flrs. 3.

Machilus globosa *A. Das.* Nov. Sp. Vern. *Kaunla,* Ass.

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.

Flrs. 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.

NORTH LAKHIMPUR (Narainpur), Duking Valley (3,000 ft.) (Lister No. 241.)

Machilus dubia *Das and Kanjilal.* Nov. Sp.

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, subequal, erect, accrescent in fruit and clasping 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 :—		
Leaves glabrous, lanceolate, ·8-2 in. broad.	1.	*P. lanceolata.*
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. ..	3.	*P. pallida.*
Leaves pubescent beneath; young shoots ferruginous-tomentose.	4.	*P. paniculata.*
Lateral nerves 15-20; under side of pedicels rusty-tomentose with long soft hairs; young shoots rusty-tomentose. Fruit ellipsoid, ·5 in. long.	5.	*P. attenuata.*
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.	6.	*P. goalparensis.*

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

1. Phœbe lanceolata *Nees.* Vern. *Moso-sigar-baphang,* Kach.; *Chang-check,* Duff.; *Thang-han-jan,* Mik.; *Deingjalong,* Kh.

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, DARRANG. 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.

Flrs. 4-5. Fr. 10-11.

2. Phœbe 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., oblanceolate or elliptic, lanceolate, acuminate, minutely pubescent when young, glabrous when mature, shining green above, glaucescent 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.

4. Phœbe paniculata *Nees.* Vern. *Mekahi*, Ass..

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, oblanceolate, (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.

5. Phœbe attenuata *Nees.* Vern *Bonsum,* Ass.; *Thaijing-phang,* Kach.; *Thing-batwang-arong,* Mik.

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 (upto 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.

6. Phœbe goalparensis *Hutch.* Vern. *Nikahi,* Mech (Goalpara); *Bonsum,* Ass.

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 *Phœbe 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 *Phœbe 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. goalparensis* Hutch. *P. Hainsiana* Brandis has been recently recorded from Naga Hills.

7. Phœbe Cooperiana *U. N. Kanjilal ex A. Das.* Nov. sp. Vern. *Mekahi* N. E. F. Tract.

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 actute, 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, ·15-·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, ·05-·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 ·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* (*Phœbe goalparensis* 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, penni- or triple-nerved, usually coriaceous. *Flowers* diœcious 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 spathulate 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 penni-nerved, 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.*

1. Actinodaphne angustifolia *Nees.* Vern. *Talakung*, Tipp.; *Lobong-kron*, Mik.; *Nabhar*, Kuki; *Petarichawa*, Ass.; *Dhupati*, Mech, *Lotron*, Nowgong; *Mechchhim-ching*, Naga.

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 shortly pedunculed, 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; fruiting 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 ·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* diœcious 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, penni-nerved :—
- Perianth not enlarged in fruit; segments 6.
  - Leaf buds naked :—
    - Peduncles slender; filaments usually hairy; petiole ·5-·9 in. long. .. .. *1. L. citrata.*
    - Peduncles stout; filaments glabrous; petiole ·3-·4 in. long. .. .. *2. L. Kingii.*
  - Leaf buds and peduncles golden brown; filaments hairy; young parts with long silky hairs; petiole ·3-·5 in. long. .. *3. L. sericea.*

Leaves persistent, penni-nerved :—
- Perianth segments obsolete or incomplete, tube scarcely enlarged in fruit.
  - Leaves coriaceous; umbellules in corymbs or racemes; petiole ·6-1·8 in. .. .. *4. L. sebifera.*
  - Leaves membranous; umbellules solitary; petiole ·5-1·5 in. .. .. .. *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.*
      - 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 ·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 upto 2 in. broad; petiole ·3-·5 in. long. .. .. .. 13. *L. salicifolia.*
Filaments spreading, hairy; fruit ·4-·5 in. long :—
Leaves not more than ·5 in. broad; petiole ·2-·3 in. long. .. .. 14. *L. angustifolia.*

Fruit oblong or oblong-ovoid :—
Leaves upto 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. læta.*
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 racemed. .. .. 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.*

Leaves thinly coriaceous, glaucous beneath with a white bloom :—
Young shoots minutely silky :—
Fruit ·4-·5 in. long. .. 22. *L. umbrosa.*

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

1. Litsæa citrata *Bl.* Vern. *Mejankeri, Mejankari,* Ass.; *Dieng-si-ing,* Kh.; *Jay-kholong,* Mech.; *Zeng-jil* or *Zeng-jir,* Garo.

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 ·8-1·6 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, ·5-·9 in. long. *Flowers* in capitate umbels solitary or in corymbs; bracts 4, ovate, membranous, glabrous, ciliate at the edges; peduncles slender, about ·5 in. long; pedicels villous. *Sepals* membranous, obovate, sub-equal. *Fruit* ·25-·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.

Flrs. 11-2. Fr. 6-7.

2. Litsæa Kingii *Hk. f.*

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

segments 6, unequal. *Stamens* 8-12; *filaments* globose. *Stigma* discoid. *Fruit* globose, ·25 in. across.

KHASI HILLS, Griffith. (F.B.I., page 156, Vol. V).

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. Litsæa sericea *Wall.*

A middle-sized deciduous tree, aromatic; young parts silky hairy; branches stout, blackish; leaf-buds punctate. *Litsœa 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.

4. Litsæa sebifera *Pers.* Vern. *Heluka, Bagnala,* Ass.; *Muka-song-arong, Chengnan-arong,* Mik.; *Porsan,* Kuki; *Dieng-ja-lowan,* Kh.; *Baturi,* Nowgong.

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.

Flrs. 4-7. Fr. Cold season.

5. Litsæa 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-obovate, 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.

UPPER ASSAM, MISHMI HILLS—Griffith (Kew No. 4,310).

(No specimen in Forest Herbarium, Shillong, F.B.I., p. 159, Vol. V).

6. Litsæa polyantha *Juss.* Vern. *Muga-song-bi-phang,* Mech; *Bol-bet,* Garo; *Holia-gach,* Jharua; *Muga* or *Hoanlu,* Ass.; *Muga-song-arong,* Mik.; *Tapit-pirawr-asing,* Miri & Abor; *Kuthmira,* Nep.; *Huoria,* Sylh.; *Punbang,* Kuki; *Haora,* Cach.; *Dieng-ja-lawan,* Synt.; *Dieng-soh-phoh-skei, Dieng-soh-tyllap,* Kh.; *Ching-jai,* Naga.

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 1·3-4 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* subglobose 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.

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

UPPER ASSAM, MISHMI HILLS, (Griffith).

(F.B.I., p. 161 Vol. V). No specimen in Forest Herbarium, Shillong.

9. Litsæa assamica *Hk. f.*

Branches terete. *Leaves* 1·5-3 by ·7-1·5 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 ·1-·3 in. long. *Umbels* few and scattered. *Flowers* small; pedicels puberulous, ·12-·15 in. long; bracts 4. *Perianth* segments 6. *Stamens* 9; filaments villous at the base. *Fruit* (immature) narrow-ellipsoid, apiculate, about ·25 in. long.

ASSAM (Jenkins).

10. Litsæa khasyana *Meissn.* Vern. *Puyo-asing*, Miri & Abor; *Shong-rong-phang*, Kach.; *Bap-kang-tang-arong*, Mik.; *Bol-thegatcha*, Garo; *Dieng-mosu*, Kh.

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 ·25 in. thick; inside pale yellow, turning brownish-yellow. *Leaves* 5-10 by 2-3·5 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 ·4-1 in. long. *Flowers* in umbellule heads; heads above ·3 in. across; bracts 4; peduncles ·2-·4 in. long. *Perianth* segments silky outside, glabrous within; stamens 7-9. *Fruit* depressed, globose, ·8-1 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.

11. Litsæa semecarpifolia *Wall.* Vern. *Bakhali*, Ass.

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.

12. Litsæa elongata *Wall.* Vern. *Petari-chawa*, Ass.; *Dieng-ja-long-ngap*, Kh.

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.

13. Litsæa salicifolia *Roxb.* Vern. *Digloti,* Ass.; *Thru-muchi,* Garo; *Ing-ing-arong,* Mik.; *Thaia-jing-phang,* Kach; *Dieng-bro-sasse-khlow,* Synt.; *Dieng-lali,* Kh.

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, ·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.**

14. Litsæa angustifolia *Wall.* Vern. *Haibru,* Manip.; *Tharham,* Lush.; *Dudhi-khansau,* Garo; *Khuwai-phang,* Kach.

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.

15. Litsæa oblonga *Wall.* Vern. *Dieng-trerthiali,* Kh.

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.

16. Litsæa læta *Benth & Hk. f.* Vern. *Bon-hoalu,* Ass.; *Chario, Jachar-changne,* Duff.; *Nampi-pongeth- Phong-rong,* Mik.; *Koimamchu,* Naga.

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 & JAINTIA 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.

17. Litsæa Meissneri *Hk. f.* Vern. *Dieng-sor-rang*, Kh.

A small or middle-sized tree, glabrous. *Bark* greenish-brown, warty, ·12 in. thick; blaze yellowish, thinly brown. *Leaves* alternate, 2·5-6 by ·8-2 in., elliptic-lanceolate or lanceolate, acuminate, coriaceous, glabrous, sub-glaucous beneath; lateral nerves (primary) 7-10 on either half, with a few shorter intermediate ones also slender; base acute; petiole ·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* ·7 in. long, oblong-ovoid, smooth. *Seed* bright red.

GARO HILLS, NAGA HILLS, KHASI & JAINTIA 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 ·5-1 in. long. *Umbel-heads* rather corymbosely racemed; bracts puberulous. *Fruit* globose, depressed, ·6-·8 in. across; lower half included in the cupular perianth; fruiting pedicels thickened, spreading, ·3-·4 in. long.

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

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

19. Litsæa nitida *Roxb.* Vern. *Kathalua, Loban* Ass.; *Lhopre,* Nep.; *Supin-um-rong,* Mik.

A middle-sized tree, glabrous. *Bark* grey, rough, about ·2 in. thick; inside creamy, yellowish, mottled with brown. *Leaves* 4-10 by 2-3 in., oblanceolate or oblong-obovate, 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 ·5-1 in. long. *Heads* 4-5-flowered, racemose, ·16-·2 in. across, (before opening) glabrous. *Male* inflorescence 2-4 in. long; peduncles about ·5 in. long, slender; bracts unequal, glabrous. *Perianth* tube turbinate, silky. *Female* inflorescence 1-2 in. long; peduncles shorter than male. *Fruit* aromatic, yellowish, ellipsoid, ·5-·7 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.

Flrs. 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 glabrascent beneath; lateral nerves 10-12 on either half; base cuneate or acute; petiole ·5-1 in. long. *Male* umbellules in tomentose racemes, 5-7 in. long, slender, drooping, 6-flowered, ·16-·25 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, ·3 in. across, enclosed in the cupular enlarged perianth (probably not quite mature).

ASSAM (Master), GOALPARA, SYLHET.

Flrs. 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, oblanceolate 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.

22. Litsæa umbrosa *Nees.* Vern. *Dieng-soh-tartiat,* Kh.

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.

23 Litsæa Mannii *King.* Vern. *Dieng--ja-lew-rit,* Kh.

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 ·08 in. across, mucronate, seated on the lobed perianth pedicel, ·1-·2 in. long pubescent.

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

Flrs. 10. Fr. 7.

11. NEOLITSEA Merr.

Evergreen trees. *Leaves* strongly tripli- or sub-triplinerved; buds perulate. *Flowers* dicœcious; 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.).

Flrs. 11. Fr. 4.

N. foliosa (*Nees*) *Gamble n. Comb.* Var. Cæsia Meissn. Vern. *Dieng-um-roa-soh-ja-dao*, Kh.

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

Flrs. (male) 11.

12. DODECADENIA Nees.

Dodecadenia paniculata *Hk. f.*

A small evergreen tree, glabrous. *Leaves* 2-7 by 1-2·2 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 ·3 ·7 in. long. *Flowers* bisexual, in sparsely pubescent axillary panicles (often from old stem); pedicels ·2-·3 in., rusty-pubescent. *Perianth-tube* short; segments (6-9) oblong, subequal, spreading; filaments hairy, 1 and 2 lines eglandular, 3 and 4 lines biglandular. *Stamens* 18; anthers 4-celled. *Fruit* obovoid or clavate, 1-1·5 by ·5-·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).

13. LINDERA *Thumb.*

Shrubs or trees often deciduous. *Leaves* alternate or sub-opposite, penni- or 3-5- nerved; buds covered with scales or naked. *Flowers* usually dioecious, pedicelled, in heads or umbels, which are enclosed in an involucre of 2-5 bracts, sessile or stalked, fascicled or racemosely arranged. *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. melastomacea.*
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).

Flrs. 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.

3. Lindera latifolia *Hk. f.* Vern. *Dieng-ja-lang,* Kh. *Dieng-lih* (*kynthai*), Kh.

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 oblanceolate 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.

Flrs.2-4. Fr. 7-10.

4. Lindera reticulata *Benth.* Vern. *Bar-dam-deuka*, Ass.

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).

Flrs. 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 ·25 in. long, stout. *Umbels* sessile, solitary or clustered, globose, upto ·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 ·25 in. long. *Flowers* very small; pedicels short, tomentose. *Perianth* tube tomentose outside; segments 6, glabrate, unequal. *Stamens* 9; filaments glabrous. *Ovary* glabrous. *Fruit* ·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.).

Flrs. 2. Fr. 7.

6. Lindera caudata *Benth.* Vern. *Dieng-soh-orthai, Dieng-tar-thia, Dieng-tyrpath-khlaw, Dieng-brau-salu, Dieng-la-tyrthiao,* Kh.; *Dieng-tyrthia, Dieng-salu, Synt.*

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 1-1·5 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 ·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 ·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.

Flrs. 10-1. Fr.6-8.

7. Lindera pulcherrima *Benth.* Vern. *Dieng-tyrthia-synrang, Dieng,-tyrsia, Dieng-tyrthia-lih, Dieng-jabu-rit,* Kh.

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.

8. Lindera melastomacea *Benth.* Vern. *Diend-si-ing,* Kh.; *Dieng-sap-khniang, Dieng-sia-sia,* Synt.

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 ·3-·5 in. long.

KHASI HILLS 3-4,500 ft.

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

9. Lindera Neesiana *Benth.*

A middle sized tree, aromatic, glabrous. *Leaves* 2-6 by ·8-1·8 in., ovate-obling, 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, ·3-·9 in. long. *Heads* 5-8-flowered, solitary or clustered (3-6 together), globose, ·2-·3 in across, (before opening); bracts 4, membranous. *Perianth* segments almost orbicular, membranous, almost glabrous. *Stamens* 9; filaments, inner biglandular. *Fruit* globose, ·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 ·25 in. long. *Umbels* upto 12-flowered, peduncled; peduncles about ·3 in. long, solitary or fascicled in leaf axils; pedicels about ·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

scars of fallen leaves. *Young* shoots, buds and petioles of the leaves rusty-pubescent. *Leaves* simple, alternate, crowded towards 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 introrse, 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 larvæ 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.

Cassytha filiformis *Linn.* Vern. *Amarbeli,* Hind.; *Akasbel,* Beng.

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 ine 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* exalbuminous.

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 upto 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.

Flrs. 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.*

2. Illigera Khasiana *C. B. Clarke.* Vern. *Kerkerilata,* Ass.; *Jermei-san-nain-blei,* Synt.

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 ·3-3·5 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, papillose-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. *Disc* 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.

Trees or shrubs. *Leaves* entire or toothed or pinnatifid. *Flowers* regular, hermaphrodite in axillary racemes, usually in pairs, bracteolate; bracts small, caducous. *Perianth* tube slender; segments ovate or oblong, ultimately revolute. *Anthers* oblong, connective produced. *Disk* of 4-hypogynous scale, free or connate. *Ovary* sessile; style slender, terminal; ovules 2. *Fruit* a subglobose hard indehiscent nut. *Seeds* 1-2.

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.*

1. Helicia erratica *Hk. f.* Vern. *Dieng-soh-tyrteit, Dieng-lingim-rit,* Khasi; *Dieng-soh-pyrtied,* Synt.

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, oblanceolate, 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.

3. Helicia excelsa *Blume.* Vern. *Thekejoy-arong.* Mik.

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.	**1. Daphne.**
Style present. Leaves alternate and opposite.	**2. Wikstrœmia.**
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 dorsifixed. *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.*

1. Daphne cannabina *Wall.* Vern. *Ka-dieng-baiong*, Kh.; *Dieng-thlu-thyrmia*, Synt.

A shrub attaining 8 ft.; bark tenacious; branchlets hairy towards the top. *Leaves* 2-5 by ·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 ·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, ·2-·5 in. long, leafy. *Perianth* corolline, cylindrical, tube ·4-·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, ·3-·5 in. long, ovoid or ellipsoid.

KHASI HILLS 5-6,000 ft.

Flrs. & 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).

Daphne shillong *Banerji.* In Kew Bulletin 1927, pp. 75-76.

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 ·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* ·5-·7 in. long, silky outside; lobes deltoid, shorter than in the last species; anthers slightly exserted. *Fruit* subglobose, ellipsoid or obovoid, fleshy, scarlet when ripe, about ·5-·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.

2. Daphne involucrata *Wall.* Vern. *Jokriarong,* Mik.; *Dien-tliuh, Dieng-soh-tylu, Tyloh-synrang,* Kh.

A shrub or sometimes a small tree. *Branchlets* glabrous except at the tips. *Leaves* 3-7 by ·75-2 in., oblong-lanceolate to elliptic-lanceolate, acuminate; base narrowed, glabrous, thinly coriaceous; lateral nerves slender, many, 14-22 pairs, arching; petiole ·15-·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 ·15-1·25 in. long, slender, more or less villous, solitary or fascicled, sometimes borne on slender axillary branches, involucral bracts obtuse, silky, ·25-·35 in. long. *Perianth-tube* ·4-·6 in. long, silky-villous; lobes ·15-·2 in. long, ovate-acuminate, upper series of anthers near the throat; style minute. *Drupe* black when ripe, ellipsoid.

KHASI & JAINTIA HILLS, 4-6,000 ft., N. CACHAR HILLS, Hotspring, MIKIR HILLS, Jortokbi.

Flrs. 10-11. Fr. 12-2.

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* s mple, ·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.

Flrs. 12-6. Fr. 6-9.

2. WIKSTRŒMIA Endl.

Wikstrœmia canescens *Meissn.* Syn. W. virgata Meissn. Vern. *Panjung-masi, Ja-tyllu,* Kh.

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.

Flrs. 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.

Flrs. 11. Fr. 1.

4. AQUILARIA Lamk.

Aquilaria agallocha *Roxb.* Vern. *Agaru, Agar.* Beng.: *Sasi.* Ass.; *Agaru,* Sans.; (Aloe-wood, eagle-wood).

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.

Flrs. 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.

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. ELÆAGNUS 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-khlur, Soh-chhang, Mi-soh-sang, Dieng-soh-sang, Mei-shong-*

klor-tyrneng, Kh.; *Dieng-soh-sylangi*, Synt.; *Birai-asing*, Miri; *Solengi-arikong*, *The-tumda-arong*, 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.

Flrs. 11-2. Fr. 4-5.

3. Elæagnus pyriformis *Hk.f.* Vern. *Doukhiguti*, Ass.; *Daublut-sitai*, Mech; *Soh-chhang-klor*, *Dieng-soh-blor*, Kh.; *Dieng-sa-shang*, Synt.

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.

Flrs. 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 Loranthaceæ.

The following literature have been consulted.

1. A revision of the Philipine Loranthaceæ by Prof. B. H. Danser.

2. A new system for the Genera of Loranthaceæ by Prof. B. H. Danser.

3. Extract Du Bulletin Du Jardin Botanique Du Buitenzorg.
Series III Vol. XVI 1938.
4. Do. Series III Vol. XIV 1936.
5. Do. Series III Vol. XIV 1937.
6. Do. Series III Vol. XIV2 1937.
7. Do. Series III Vol. X 1929.

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 : -
Thecæ more oblong to linear :
Pollen grains bilocellate. .. **3. Helixanthera.**
Inner perianth 4-6 :—
Petals not hastately dilated above the base :—
Thecæ 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. .. **6. Dendrophthoe.**
Ovary and fruit strongly attenuate towards the base :--
Flowers zygomorphic (4 merous) :
Bract at the base of each flower. **7. Scurrula.**
Flowers quite regular (5 merous) :—
Bracts of the involucre free or more or less connate and quite different from the normal leaves. **8. Tolypanthus.**
Bracteolate :
3 bracts at the base of each flower : -
Flowers 6-merous. .. .. **9. Macrosolen.**

1. KORTHALSELLA Van. Tiegh. Ampl. Engler.

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.

Korthalsea opuntia (*Thunb*) *Merrill.* Syn. Viscum opuntia *Thunb.*

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, ·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 diœcious) 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.	..	..	.. 1. *V. monoicum.*
Branches leafless.	..	..	.. 2. *V. articulatum.*

1. Viscum monoicum *Roxb. Ex. De Candolle.*

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 ·05-·1 in long. *Flowers* in axillary fascicles; bracteoles apiculate. *Perianth* lobes 4. *Berry* oblong or ellipsoid, shortly stipitate, ·2-·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 parasttic shrub. *Branches* flattened, striate, readily disarticulating and contracted at the nodes. *Leaves* ·75-2·25 by ·1-·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 ·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.

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

Inflorescence many-flowered glabrous :—	
Style jointed in the middle. ..	1. *H. parasitica.*
Inflorescence many-flowered, tomentose:—	
Style not jointed.	2. *H. coccinea.*
Inflorescence few-flowered, rusty-pubescent; young parts pubescent.	3. *H. ligustrina.*
Inflorescence few-flowered, glabrous:—	
Quite glabrous plant.	4. *H. terrestris.*

1. Helixanthera parasitica *Lour.* Syn. Loranthus pentapetalus Roxb.

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.

2. Helixanthera coccinea (*Jack*) *Danser.* Syn. Loranthus coccinea Jack.

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* ovoïd, 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.

3. Helixanthera ligustrina (*Wall*) *Danser*. Syn. Loranthus ligustrinus Wall. Vern. *Makariang*, Synt.; *Suthekmi-songepa*, Garo.

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, ·05-·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, ·16-·25 by ·09-·1 in.

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

Parasitic on Machilus Gamblei, Phyllanthus Emblica, Eurya acuminata, Castanopsis tribuloides, Ficus clavata, Saurauja punduana and Glochid on oblatum.

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

4. Helixanthera terrestris (*Hk. f*) *Danser*. Syn. Loranthus terrestris Hk. f.

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 diœcious, in spikes; each flower subtended by a single bract. *Flowers* in spikes. *Corolla* choripetalous, 5-6-merous. *Anthers* basifixed; thecæ 2, globose or semi-globose, each with 2 white or yellowish loculi ·1-·17 in. long. *Style* clavate (in bisexual and female flowers). *Fruit* sub-globose.

Hyphear odoratum (*Wall*) *Danser*. Syn. Loranthus odoratus Wall.

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 & JAINTIA 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.

Taxillus vestitus (*Wall*) *Danser.* Syn. Loranthus vestitus Wall. Vern. *Soh-maka-riang*, Kh.

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 & JAINTIA HILLS (6,000 ft.).

Parasitic on Quercus Griffithii, Castanopsis Hystrix and Pygeum montanum.

Flrs. & Fr. [illegible].

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; thecæ 4, rarely locellate. *Ovary* and fruit slightly (or not) alternate at the base; exocarp coriaceous; mesocarp viscous.

Flowers glabrous :—	
Corolla 1·2-2 in. long; lobes shorter than the tube :—	
Scarlet or orange.	*1. D. falcata.*
Flowers finely pubescent :—	
Corolla ·51 in. long; lobes twice the length of the tube, green outside, yellow within.	*2. D. pentandra.*

1. Dendropthoe falcata (*Linn. fil*) *Ettingshausen.* Syn. Loranthus longiflorus *Desrousseau.* Vern. *Bajrangi*, Sylh.; *Tuthekmi. Garo.*

A large glabrous bushy parasite. *Bark* grey or reddish brown. *Leaves* 2·5-6 by ·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, upcurved axillary or supra-axillary racemes, sometimes solitary. *Calyx* tooth produced beyond the ovary. *Corolla* glabrous: tube ·1 in. in diameter at base, gradually expanding to ·2 in. in diameter at apex; lobes 5, shorter than the tube, greenish yellow; style slender, green, sub-persistent; stigma globose. *Berry* ·3-·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).

2. Dendropthoe pentandra (*Linn.*) *Miquel.* Syn. Loranthus pentandrus Linn.

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-·5 in. long. *Flowers* finely pubescent in axillary racemes, sometimes fascicled. *Bract* ovate, embracing the base of the calyx. *Calyx* 5-toothed, 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).

Flrs. 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.*

1. Scurrula parasitica *Linn.* Syn Loranthus Scurrula Linn. Vern. *Dieng-mong-karing*, Kh.

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 ·25-·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, ·25-·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* ·2-·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.

2. Scurrula pulverulenta (*Wall.*) *G. Don.* Syn. Loranthus pulverulentus Wall. Vern. *Mang-kariang.* Kh.: *Makariangbasaw*, Synt.

A common stout woody parasite. *Bark* darkish grey; branches lenticellate; young shoots white, floccose. *Leaves* 2-6 by ·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 ·3-·7 in. long. *Flowers* 1-1·5 in. long, buff-coloured, in axillary, often fasciculate racemes covered with soft grey tomentum. *Corolla* tube slit on one side, curved lobes 4; style red. *Fruit* club-shaped, supported by a bract at the base, ·5 in. long.

Specimen No. 6039 (Kanjilal) has got oblong truncate fruit ·25-·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, Symplocos spicata, Saurauja punduana, Myrica Nagi, Pourthiæa arguta, Mæsa ramentacea and Castanopsis tribuloides.

Flrs. & Fr. 11-1.

3. Scurrula umbellifer (*Schult*) *G. Don.* Syn. Loranthus umbellifer Schultes. Vern. *Thikthi*, Kuki.

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 & JAINTIA HILLS (5.500 ft.).
Parasitic on Vatica lanceæfolia and Symplocos spicata.

Flrs. & Fr. 8-12.

8. TOLYPANTHUS Bl., in Schut., Syst., 7, 2. p. 1731 (1830).

Tolypanthus involucratus (*Roxb.*) *Van. Tiegh.* Syn. Loranthus involucratus Roxb. Vern. *Raghumala*, *Birikhmara*, Ass.; *Armit-kap*, Tipp.

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 specially 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., Lagerstræmia parviflora, Styrax serrulatum, Delima sarmentosa.

Flrs. & 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.*

1. Macrosolen cochinchinensis (*Lour*) *Van Tiegh.* Syn. Loranthus ampullaceus Roxb. & L. globosus Roxb. Vern. *Aijheru.* Nep.; *Raghumala*, Ass.

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, GARO HILLS.

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

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

2. Macrosolen psilanthus (*Hk. f.*) *Danser.* Syn. Loranthus psilanthus Hk. f. Vern. *Soh-pydung-lording. Dieng-kyajatparoh*, Kh.

A robust glabrous shrub; branchlets lenticellate. *Bark* 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 & JAINTIA 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.

FAM. 121. SANTALACEÆ.

Trees, shrubs or herbs, mostly parasitic or semi-parasitic. *Leaves* entire, alternate or opposite, sometimes scale-like or 0, exstipulate. *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, monœcious or diœcious, 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 ·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 pedunculed 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.

Pyrularia edulis *A.DC.* Syn. Sphærocarya edulis Wall. Vern *Dieng-soh-klong*, Kh.; *Thing-beng*, Mik.

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-·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; albumen 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.*

A stout fleshy herb. *Peduncles* very stout, 1-4 in. long; flowers diœcious; heads 3-8 in. long. *Male Flowers*: filaments velvety. *Female Flowers* minute.

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

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.

loculicidally 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.

Sarcococca pruniformis *Lindl.* Vern. *Chilne,* Nep.; *Tiw-deng-pah,* Khasi.

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 triplinerved 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 diœcious. *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 veritical 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 :—
            Fruit capsular. .. .. **4. Cleistanthus.**

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. Prosorus.**
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 :—
Seeds without aril. .. .. **16. Aporosa.**
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 :—
Stamens 8-12. .. .. .. **24. Jatropha.**
Calyx segments 2-3, valvate :—
Stamens 8-20. .. .. **25. Aleurites.**
Flowers in androgynous spikes or racemes :—
Calyx segments imbricate or valvate; filaments inflexed in bud :—
Stamens 10-30. .. .. .. **26. Croton.**
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.**
Stamens 8-35. .. .. **28. Ostodes.**
Sepals imbricate, usually enlarged in fruit :—
Flowers in male apetalous. .. .. **29. Blachia.**

Sepals valvate :—
Stellate-tomentose anther cells contiguous, parallel. .. .. **30. Sumbavia.**
Petals 0. Calyx campanulate :—
Stamens 10, free. .. .. .. **31. Manihot.**
Anthers sessile, 5-10. adnate to a column. .. **32. Hevea.**
Petals 0. Sepals imbricate :—
Male flowers in fascicles :—
Fruit smooth, tardily dehiscent :—
Leaves pellucid-punctate. .. .. **33. Gelonium.**
Fruit capsular, echinate. .. .. **34. Chætocarpus.**
Male flowers in panicled cymes :—
Capsule of two-valved cocci. .. .. **35. Baliospermum.**
Petals 0. Calyx sub-vertically 4-lobed; leaves not punctate :—
Male flowers racemed :—
Fruit indehiscent. .. .. .. **36. Endospermum.**
Petals 0. 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. Excœcaria.**
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, penni-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. Pterococcus.**

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. .. .. .. 2. *E. neriifolia.*

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, caducous, alternate, 5-10 by 1·25-2·5 in., oblanceolate, 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 1·5-2·5 in., obovate-oblong or obovate-spathulate, sub-acute, mucronate, fleshy, smooth, glabrous; 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 bundles. *Styles* connate. *Capsule* about ·25 in. across.

KHASI & JAINTIA HILLS; Plains of ASSAM. Apparently cultivated.
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 occuring in N. C. HILLS & KHASI & JAINTIA HILLS. (No specimen in Forest Herbarium, Shillong).

E. khasyana *Boiss.* Vern. *Soh-kyrmoit-blang*, Kh.

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 rommon in grass land (upto 600 ft.).

Fr. 11.

E. hypericifolia *Linn.*

A slender annual *Leaves* opposite, ·3-·9 by ·05 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.

Flrs. 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).

Flrs. 1.

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

2. BISCHOFIA Blume.

Bischofia javanica *Bl. Vern. Thai-jilit.* Kach.; *Takkirasing*, Miri; *Urium*, Ass.; *Sintir-asing*, Balipara; *Mebu-changne*, Duff.; *Dieng-soh-tung, Dieng-Jameu,* Kh.; *Jhoki,* Cach.; *Khung-thli*, Lush.: *Khong-shi,* Kuki; *Khung-thi,* Tipp.; *Jokki*, Sylh.; *Thaiso*, Mech.; *Phang-put,* Mik.; *Phung-arong*, Mik.; *Naiching,* Naga; *Bolasri, Thichri, Asri,* Garo; *Dieng-satung,* Synt.

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, diœcious, 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* pedicelled (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 (upto 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 unsatifactorily. 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, monœcious or diœcious, 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.*

1. Bridelia retusa *Spreng.* Vern. *Khasi,* Garo; *Kunhir, Kuhir,* Ass.; *Turtung-arong,* Mik.; *Kata-kusi.* Mech.; *Thijigrey-phang,* Kach.; *Dieng-rishan,* Kh.

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 & JAINTIA 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.

2. Bridelia verrucosa *Haines.* (Syn. B. montana Willd.) Vern. *Gayo*, Nep.

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 oblanceolate, entire; innner 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.

Flrs. 4-5. Fr. End of Rainy season.

3. Bridelia assamica *Hk. f.* Vern. *Barhaita,* Ass.

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.

Flrs. & Fr. Cold season.

4. Bridelia pubescens *Kurz.* Vern. *Dieng-chehhi. Dieng-shih,* Synt.; *Dieng-soh-mantan. Raishan-kynthei,* Kh.; *Gayo,* Nep.

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, ·5 by ·25 in., red when ripe, one-seeded, seated on the calyx.

LAKHIMPUR, NOWGONG, GOALPARA, KHASI & JAINTIA HILLS. (upto 5,000 ft.)

Flrs. 4. Fr. 8-10. (ripe fruit 12-2).

5. Bridelia tomentosa *Bl.* Vern. *Pat-kunhi, Mor-kunhi,* Ass.; *Khasi-dubret,* Garo; *Phak-tel,* Kuki; *Sikhreti,* Kamrup; *Dieng-soh-puet-paroa-synrang,* Kh.; *Thebihi-arong,* Mik.; *Thai-dau-blib,* Kach.

A shrub or a small tree (30′/20″); twigs rusty-tomentose. *Bark* greyish-warty, ·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 ·1-·2 in. long, pubescent (always). *Flowers* in axillary clusters; bracts minute, villous. *Male flowers*: shortly pedicelled; petal crenate, broader than long. *Female flowers*: shortly pedicelled; calyx about ·11 in. across in fruit; segments triangular; petals suborbicular, entire. *Drupe* ·25 in. across, blue-black. globose, seated on the calyx.

SIBSAGAR, NOWGONG, KAMRUP, DARRANG, GOALPARA, GARO HILLS, CACHAR (N. C. HILLS) KHASI & JAINTIA HILLS.

Flrs. 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 ·2 in. long, glabrescent, rugose at the base. *Flowers* in axillary glomerules, glabrous, ·1 in. across; peduncles ·1-·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 ·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).

8. Bridelia stipularis *Bl.* Vern. *Sepaph-phang*, Kach.; *Lata-mendi*, *Hom-homali*, Darrang, *U-mei-tong-krong*, *Risan-um*. Kh.; *Pat-khowai*, Sylh. *Thebhi-arong*, Mik.; *Phak-tel-lien*, Kuki; *Sagal-lederi*, *Mouhilika*, Ass.

A large more or less scrambling or climbing shrub; branchlets pubescent or tomentose, pendent; stem woody. *Bark* whitish, thin, rough; blaze reddish. *Leaves* 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* ·25 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, ·5 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 officianalis*. 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, monœcious. *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.

Flrs. 3. Fr. 5.

5. ACTEPHILA Bl.

Actephila excelsa (*Dalz*) *Pax & Hoffm.* Syn. Actephila excelsa Muell. Arg.

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 pedicel up to 4 in. long.

SIBSAGAR, N. C. HILLS, NOWGONG, KHASI & JAINTIA HILLS, (upto 4,000 ft.).

Flrs. 9. Fr. 12-1.

6. ANDRACHNE Linn.

Herbs or undershrubs. *Leaves* usually alternate, entire, membranous. *Flowers* monœcious, 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* monœcious, 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* 2·3-3·5 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, ·07 in. long. *Disc* glands alternate with the calyx-segments, ·02 in. long, membranous, deeply bilobed. *Ovary* trilocular, 6 ovulate; style 4-6, ·02 in. long. *Capsule* depressed, globose, about ·02 in. across. *Seeds* 6, angulate, ·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.
(F. B. I. P. 285, Vol. V).
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 cilliate 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.

Neopaltandra 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.

MISHMI HILLS (Griffith—4811). (F.B.I., P. 287, Vol. V). (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 subsolitary. *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. bœobatryoides.*

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. Rœperianus.*

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 obcordate :—

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.*

1. Phyllanthus bœobatryoides *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 & JAINTIA 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* ·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* ·13 in. across; depressed-globose.

Mamloo (K. & J. Hills), MANIPUR. (F.B.I. V. P. 224).

3. Phyllanthus parvifolius *Ham.* Vern. *Tew-khapnip, Ja-la-mat-kha,* Kh.

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 ·15 in. across, globose, obscurely 3-lobed, purplish. *Seeds* smooth.

KHASI & JAINTIA 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, ·2-·6 by ·1-·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 ·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* ·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, ·5-1·5 by ·3-·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* ·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 leschenaultii *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 subacute, membranous, glabrous; lateral nerves 4-8 on either half, very slender; base rounded or acute; petiole very slender, ·07-1 in. long; stipules about ·4 in. long, lanceolate. *Flowers* minute, male and female often from the same axils; pedicels filiform, ·16-·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* ·12 in. across, sub-globose.

KHASI HILLS, (2-5,000 ft.)
Flrs. & Fr. 6-8. (Haines).

7. Phyllanthus Clarkei *Hk. f.* Vern. *Soh-sa-kuriau.* Kh.

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 ·1 in. long; stipules fimbriate, membranous, *Flowers* sub-solitary: pedicels filiform, about ·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 ·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, ·05-·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, ·05-·8 in. across.

N. E. F. TRACT (Burkill's No. 37,147) MISHMI HILLS. (Griffith 4,821).

Flrs. 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).

Flrs. & 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 & JAINTIA 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 & JAINTIA HILLS (Umsaw).

Flrs. 7.

9. REIDIA Wight.

Herbs, shrubs or undershrubs. *Leaves* alternate, various, usually membranous; stipules small. *Flowers* monœcious 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 upto 3·5 in. long, lanceolate :—
  Calyx of male pectinately fimbriate, of female serrate :—
    Fruit ·25 in. across; globose. .. 2. *R. tetrandra.*

1. Reidia Hamiltoniana (*Muell*). *Cowan.* (Syn. Phyllanthus Hamiltonianus Muell). Vern. *Moyra-tikoni,* Ass.

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 ·5 in. long, very slender or capillary. *Male* perianth segments pectinately fimbriate; disc glands 2-lobed. *Ovary* smooth. *Fruit* deeply 3-lobed, ·25 in. across; cocci thinly crustaceous.

SYLHET.

10. PROSORUS Dalz.

Trees. *Leaves* alternate, deciduous. *Flowers* dioœcious; 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; ovules 2 in each cell; style shortly bifid. *Capsule* globose; epicarp thin; seeds 6, irregularly trigonous, arillate; albumen coarse; cotyledons small, flat.

Prosorus indicus (*Muell*) *Dalz.* (Syn. Phyllanthus indicus Muell). Vern. *Gunamala*, *Tukora*, Ass.; *Yogir-asing*, Miri; *Sikat-liupi-asing*, Abor; *Pong-ser-baphang*, *Thai-jigre-buphang*, Kach.; *Phong-arong*, *Nalong*, Mik.; *Theipuithing*, Kuki; *Heiru*, Manip.; *Nagaratijam*, Cach.; *Bajardanti*, Hind.; *Mota-ponial*, Sibsagar.

A large or moderate sized tree (60′/53″). *Bark* greyish-brown, smooth, exfoliating in large papery flakes, ·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; ovules 2 in each cell; style bifid with recurved lobes. *Fruit* spherical, depressed, ·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* dicœcious, 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 accuminate, membraneous, glaucous beneath; lateral nerves 5-10 on either half; base acute; petiole ·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 ·05-·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, GARO HILLS, KHASI & JAINTIA HILLS (5-6,000 ft.).

Flrs. 12-3. Fr. 3-6.

13. EMBLICA Gærtn.

Trees; branchlets distichous. *Leaves* small, pinnately arranged on the branchlets; stipules scarious, minute. *Flowers* monœcious, 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.

Emblica officinalis *Gærtn.* (Syn. Phyllanthus Emblica Linn.) The Emblic Myrobolan. Sans. *Amluki*, Vern. *Aonla*, *Eola*, *Awla*, Beng.; *Gulian-tenga* or *Amalaki*, Ass.

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, monœcious in axillary clusters, usually crowded towards the lower naked portion of the branchlets. *Male flowers* : perianth 6, imbricate, ovate-oblong; pedicels upto ·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."

Astringent, demulcent and tonic. (Watt's Dictionary of the Economic Products of India, p. 219, Vol. VI).

Flrs. 3-5. Fr. Cold season.

14. FLUEGGEA Willd.

Fluggea virosa *Baill.* (Syn. Flueggea microcarpa Bl.) Vern. *Dieng-krong-wait-lam,* Kh., *Khaukura,* Sylh. *Mihoi,* Tipp. *Hukhen-biphang* Mech; *Dumikron,* Garo. *Sugane,* Kach.; *Hatititi,* Miri; *Cheng-cheng-arong,* Mik.; *Masek,* Kuki.

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* dicœcious, 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 fid. *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 (upto 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.

Baccaurea sapida (*Roxb*) *Muell. Arg.* Vern. *Buri*, Miri; *Leteku*, Ass.; *Khushmai-phang*, Kach.; *Dampiyu-arong*, Mik.; *Dieng-soh-ram-dieng*, Kh.; *Bhubi*, Sylh.; *Moktok*, Manip.; *Pangkai*, Lush.; *Aphek*, Kuki; *Iphek*, Tipp.; *Dojuka*, Garo; *Phaduk-jela*, Mech.; *Notko*, Rajbungshi; *Lotka*, Beng.

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 ·5-1·75 in., thick, geniculate. *Flowers* dicœcious, 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, embeded 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 diœcious, 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.*

1. Aporosa Roxburghii *Baill.* Vern. *Samphere, Khoi-doi*, Mech; *Chhamolja*, Garo; *Garo-khuta*, Kamrup; *Tamsir-arong*, Mik.; *Khempasi-baphang*, Kach.; *Khokora, Bara-heloch*, Ass.; *Tinsibi*, Manip.; *Sontul*, Lush.; *Debaru*, Duff.

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, sinuately 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.

2. Aparosa oblonga *Muell. Arg.* Vern. *Chham-chholja,* Garo.

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.

3. Aporosa Wallichii *Hk. f.* Vern. *Tansil-arong,* Mik.; *Chamcholja,* Garo.

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.

Flrs. 3. Fr. Early rains.

4. Aporosa aurea *Hk. f.* Vern. *Chhamolia*, Garo; *Dieng-soh-kyrsiu*, Kh. *Garo-khuta*, Ass.; *Sesri*. Sylh.

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 accuminate, 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 & JAINTIA HILLS, KAMRUP, (up to 4,000 ft.).

Timber used for house posts. Decoction of leaves is used as a yellow dye.

Flrs. 11. Fr. 1.

17. ANTIDESMA *Linn.*

Trees or shrubs. *Leaves* alternate, entire, stipulate. *Flowers* bracteate, dicœcious, apetalous, in slender lateral or terminal, simple or panicled 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. Ghesæmbilla.*
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.*

1. Antidesma Ghesæmbilla *Gærtn.* Vern. *Heloch. Mikhan-tenga.* Ass.; *Theng-merok-aronz.* Mik.; *Tendera,* Sylh.

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 & JAINTIA 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 ·05-·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.

3. Antidesma Bunius *Spreng.* Vern. *Malung-renu*, Tipp.; *Karanda*, Sylh.; *Bol-aborak*, Garo; *Dieng-soh-silli*, Kh.; *Somkong-asing*, N. E. F. Tract; *Bor-Heloch*, *Pani-heloch*, Ass.

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, lobed, 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).

SYLHET, GARO HILLS, SIBSAGAR, N. E. F. TRACT, LAKHIMPUR, N. C. HILLS, LUSHAI HILLS, MANIPUR, KHASI & JAINTIA HILLS.

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 ·05-·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, ·16 in. across.

SIBSAGAR, SYLHET.

Flrs. 4. Fr. 11.

5. Antidesma diandrum *Roth.* Vern. *Lapha-sakho*, Mech.; *Aburok*, Garo; *Gori-ambol*, Jharua; *Chhotha-heloch*, *Abutenga*, *Nekhon-tenga*, Ass.; *Dieng-japeu*, *Chouding*, Kh.; *Bon-karancha*, Sylh.; *Ing-sum-arong*, Mik.

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 ·05-·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 ·16-·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.

6. Antidesma acuminatum *Wall.* Vern. *Dieng-soh-lang-ngiu, Dieng-pothar,* Kh.; *Pani-heloch,* Ass.

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 panicled hairy racemes; sepals 3-4; disc fleshy, glabrous; stamens 3-4; pistillode conspicuous. *Female flowers* in much larger panicled racemes; ovary glabrous. *Fruit* ·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.

7. Antidesma khasianum *Hk. f.* Vern. *Dieng-soh-syllih,* Kh.

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 & JAINTIA HILLS (up to 4,700 ft.).

Fruits are edible.

Flrs. 7. Fr. 10-11.

8. Antidesma Menasu *Miquel.*

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 ·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*-calyx cupular, 3-4-partite; lobes rounded; stamens 3-4, united between the lobes of the glabrous disc. *Female flowers*-calyx 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.*

Flrs. 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 ·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. DAPHNIPHYLLUM Blume.

Evergreen trees, glabrous. *Leaves* alternate, long-petiolate, entire, penninerved, approximate at the ends of branchlets. *Flowers* dicœcious, 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. .. .. .. 1. *D. himalayense.*
  Leaves not at all papillose :—
    Lateral nerves 12-16 on either half :—
      Stamens 9-10. .. .. .. 2. *D. chartaceum.*

1. Daphniphyllum himalayense *Muell.* Vern. *Dieng-synrang-thuli*, Kh.

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 haif; petiole 1-2 in. long. *Flowers* dicœcious, 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, ·5-·6 by ·2-·3 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 ·8-1·6 in. long. *Male* raceme ·6-1 in. long; pedicel ·12-·17 in. long; calyx obsolete; stamens 9-10. *Female flowers* not seen. *Fruit* ·4-·52 in. long, ellipsoid; pedicel of fruit ·3-·4 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 cocci; 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. .. .. .. *1. S. androgynus.*

Branchlets terete :—
Leaves oblong or linear-oblong, obtuse :—
Calyx disciform, 6-fid; segments rounded or reniform. .. .. .. 2. *S. oblongifolius.*
Leaves lanceolate-acuminate :—
Calyx 6-partite; segments oblong. .. 3. *S. lanceolatus.*
Leaves ovate-lanceolate, acuminate :—
Calyx deeply 5-fid; segments obovate, spathulate. .. .. .. 4. *S. macrophyllus.*
Leaves triple-nerved :—
Leaves ovate or lanceolate, acuminate, glabrous :—
Calyx enlarged in fruit; segments ovate-oblong. .. .. .. 5. *S. trinervius.*

1. Sauropus androgynus (*Linn.*) Merr. (Syn. Sauropus albicans Bl.) Vern. *Dieng-soh-pit.* Kh.

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.

MISHMI HILLS, UPPER ASSAM (Kew 4825). (F.B.I., Vol. V. p. 333).

4. Sauropus macrophyllus *Hk. f.* Vern. *Shung-rung-phang*, Kach.

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.*

1. Breynia patens *Benth.* Vern. *Soh-matiar-syurang*, Kh.; *Khakra*, Sylh.; *Chhitki*, Beng.

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 p o-duced 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 & JAINTIA HILLS, (upto 5,000 ft.).

Flrs. 3-5. Fr. 7.

2. Breynia rhamnoides *Muell.*

A shrub or small tree, glabrous; branches horizontal; branchlets angular. *Bark* yellowish. *Leaves* distichous, usually close-set, ·5-1·5 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-·12 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, ·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 :—

Fruit orange coloured, ·6-·7 in. long :—
Pedicel ·1 in. long. .. .. 1. *D. subsessilis.*
Lateral nerves 6-7 on either half :—
Fruit yellowish, 1 in. long :—
Pedicel upto ·2 in. long. .. 2. *D. Griffithii.*
Lateral nerves 10-12 on either half :—
Sepals sub-orbicular :—
Pedicel ·25 in. long. .. 3. *D. indicus.*
Lateral nerves 6-10 on either half :—
Sepals oblong :—
Pedicel ·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 :—
Leaves membranous, denticulate. .. 8. *D. jaintensis.*

1. Dryptes subsessilis (*Kurz*) *Pax et Hoffm.* (Syn. Cyclostemon subsessilis Kurz.) Vern. *Budrant*, Nep.; *Laliphang*, Kach.; *Mei-serel*, Kuki.

A large tree (70′/72″). *Bark* greyish, fairly smooth, covered with large blackish warts, ·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 ·1-·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; stigma 2 or 3. triangular, minute. *Fruit* orange-coloured, ovoid-oblong, obscurely 4-lobed, puberulous, ·6-·8 in. long; peduncle thickened.

NOWGONG, N. C. HILLS.
Used for posts. Fruits are eaten.
Flrs. 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.

KHASI HILLS, (Griffith 4376). F.B.I., Vol. V, p. 340).

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 1-1·25 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.

5. Dryptes eglandulosa (*Kurz*) *Pax et Hoffm.* (Syn. Cyclostemon eglandulosus Kurz). Vern. *Jam.* Cachar & Manip.

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.

6. Dryptes elliptica (*Hk. f.*) *Pax et Hoffm.* (Syn. Cyclostemon ellipticus Hk. f.). Vern. *Moi-serel,* Kuki; *Bon-sagu-phang,* Kach.

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.

Flrs. 5.

7. Dryptes assamica (*Hk. f.*) *Pax et Hoffm.* (Syn. Cyclostemon assamicus Hk. f.). Vern. *Phang-gait-arong, Lali,* Mik.; *Dieng-pankher,* Kh.; *Dukoha,* Ass.; *Jam,* Cach. and Manip.

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-oblong 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.

Flrs. 10-1. Fr. 3-4.

8. Dryptes jaintensis (*Clarke*) *Pax et Hoffm* (Syn. Cyclostemon jaintensis C. B. Clarke).

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

dicœcious 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:—
cous; style a 3-grooved cone. .. .. 8. *G. Thomsoni.*
Branchlets pubescent :—
Leaves ovate or elliptic, softly tomentose:—
Capsule 4-7 lobed, almost sessile. .. 9. *G. velutinum.*
Leaves elliptic, obtuse :—
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. sphærogynum.*

Leaves ovate-oblong or elliptic-oblong :—
Ovary globose, pubescent, usually 6-celled. .. 16. *G. arborescens.*

1. Glochidion multiloculare *Muell.* Vern. *Garumora, Pani-mudi,* Ass.; *Thaka-biphang,* Mech.

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 ·05-·1 in. long;

stipules acuminate ·1-·2 in. long. *Pedicels* short, stout. *Anthers* 4-12. *Styles* broad, convex with a hollowed top. *Ovary* 10-15-celled. *Capsule* ·7-1 in. across, depressed globose; base and apex intruded. *Seeds red.*

SIBSAGAR, NOWGONG, LUSHAI HILLS, CACHAR, GOALPARA.

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-·16 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).

3. Glochidion lanceolarium *Dalz.* Vern. *Armlochan.* Naga.

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.

Flrs. 9-11. Fr. 2-5.

4. Glochidion Gamblei *Hk. f.* Vern. *Bol-chring*, Garo.

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 ·05-·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.

Flrs. 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, ·4-·6 in. across.

SIBSAGAR (Deroi Reserve, Kanjilal's No. 1871).

Flrs. Rainy season. Fr. 10-12.

6. Glochidion hirsutum *Muell. Arg.*

A shrub or small tree; young parts softly tomentose. *Leaves* 5-7 in. long, elllptic-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 ·16 in. long. *Male & Female flowers* usually in the same cluster, usually supra axillary; peduncles usually short and stout. *Male flowers* pedicels slender, ·2-·5 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.

7. Glochidion oblatum *Hk. f.* Vern. *Gorumara,* Ass.; *Podousi-asing, Tapokili,* Miri.

A small tree; branchlets tomentose. *Bark* reddish-brown, finely fibrous, ·12 in. thick. *Leaves* ·8-4 by ·5-1 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 ·05-·1 in. long; stipules filiform. *Male flowers* ·2 in. across, yellowish, pubescent; pedicels filiform, ·5-·7 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.

9. Glochidion velutinum *Wight.* Vern. *Dieng-jem, Wah-puriem, Uding-that,* Kh.; *Bolchiring,* Garo; *Dol-poduli,* Ass.; *Bon-hadow,* Kach.

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, glabrous 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 & JAINTIA HILLS.

Flrs. 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).

Flrs. 3. Fr. 9-10.

11. Glochidion acuminatum *Muell. Arg.* Vern. *Dieng-jerti,* Kh.; *Dieng-jem,* Synt.

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 elther 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. *Seed* reddish, shining.

N. C. HILLS, KHASI & JAINTIA HILLS, (4-5,500 ft.).

Flrs. 4. Fr. 9.

12. Glochidion Daltoni *Kurz.*

A deciduous shrub or small tree; branchlets glabrous. *Leaves* 2-5 by ·75-1·2 in., lanceolate or oblong-lanceolate, acuminate, glabrous, shining; lateral nerves slender; base acute; petiole ·1 in. long; stipules ovate, acute. *Flowers* both sexes in the same fascicles. *Male flowers* glabrous; sepals oblanceolate; pedicels ·2-·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* ·5-·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.

13. Glochidion khasicum *Hk. f.* Vern. *Dieng-Jirti,* Kh.

A middle sized tree (35′/40″), glabrous; branchlets angular. *Bark* fairly smooth, brownish; inside reddish brown with fine white streaks. *Leaves* 2-6 by ·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 ·1-·3 in. long. *Male flowers* shortly pedicelled; sepals lanceolate, obtuse; anthers 3; connective imbricate. *Female flowers* sub-sessile; sepal ovate-oblong, unequal; style 2-3 times the length of the sepal, sub-cylindric, unequally 2-3-toothed. *Ovary* glabrous. *Capsule* ·3 in. across, depressed, globose, 6-12-lobed, glabrous, reddish when ripe.

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

Flrs. Hot season. Fr. 9-11.

14. Glochidion assamicum *Hk. f.* Vern. *Panichhitiki.* Ass.; *Tachak-changne,* Duff.; *Dieng-soh-kassiu,* Kh.; *Awal.* Sylh.

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.

15. Glochidion sphærogynum *Kurz.* Vern. *Chaiang*, Naga; *Uiangon*, Manip.; *Bol-Jagru*, Garo; *Theng-korang-arong*, Mik.; *Dieng-soh-um*, Kh.

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.

16. Glochidion arborescens *Bl.* Vern. *Panimudi*, Ass.; *Toi-tit*, Lush.

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.*

1. Jatropha gossypifolia *Linn.* Vern. *Bhotera,* Ass.; *Lal-bherenda,* Beng.

A shrub. *Leaves* palmately 3-5-lobed; petioles clothed *Lal-Bherenda,* Beng.

A shrub. *Leaves* palmately 3-5 lobed; petioles clothed with numerous fascicled and branched stipitate glands. *Corolla* lobes nearly free. Stamens connate. *Ovary* pubescent. *Capsule* ·5 in. across, rugose.

A native of Brazil, cultivated in gardens and found as an escape.

Flrs. & Fr. Usually rainy season.

2. Jathropha Curcas *Linn.* Vern. *Sabon,* Sylh.; *Borbandong,* Garo; *Bongali-bhotora,* Ass.; *Radau-khrong,* Kach.; *Thing-nai-wong,* Kuki; *Dieng-song-la-moh-dkhar,* Kh.; *Bherenda,* Beng.

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, somewrat 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.

Aleurites moluccana *Willd.* (Syn. A. triloba Forst.). Vern. *Mota-bhela,* Ass.

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* monœcious, in large terminal tomentose panicled cymes. *Calyx* velvety, bursting into 2 valvate lobes; petals 5, ·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.

Flrs. 2-4. Fr. Following Cold season.

A. cordata *Steudel.*

A tree of China and Japan. *Leaves* glabrous, ovate, cordate, often deeply lobed. *Petals* ·5 in. long. *Anthers* reflexed after flowering. Cultivated in UPPER ASSAM for the wood oil (*Tung*). SIBSAGAR, LAKHIMPUR.

A. Fordii *Hemsl.* 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.

Flrs. 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 monœcious, 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.	1.	*C. oblongifolius.*
Leaves quite entire or remotely serrate accuminate :—		
Petiole ·3-2 in. long :—		
Capsule ovoid, 1-1·5 in. long. ..	2.	*C. Joufra.*
Inflorescence stellately pubescent :—		
Basal nerves 3-5 :—		
Leaves scaberulous or pubescent with stellate hairs :—		
Racemes 4-10 in. long :—		
Stamens silky below. ..	3.	*C. caudatus.*
Leaves glabrous :—		
Racemes 2-3 in. long :—		
Stamens glabrous (15-25). ..	4.	*C. Tiglium.*
Inflorescence glabrous :—		
Leaves membranous, glabrous :—		
Racemes 2-4 in. long:—		
Stamens about 10.	5.	*C. lævifolius.*
Ovary glabrous :—		
Calyx segments much enlarged in fruit :—		
Leaves lanceolate, caudate-acuminate, serrulate.	6.	*C. chlorocalyx.*

1. Croton oblongifolius *Roxb.* Vern. *Maisindai-buphang,* Mech.; *Thing-ban-thing,* Naga; *Mahunda,* Ass.; *Bol-mang-chham,* Garo; *Dieng-la-masu,* Kh.; *Marthu-arong.* Mik.

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, GARO HILLS, NOWGONG, KHASI & JAINTIA HILLS.

Flrs. 12-2. Fr. 3-4.

2. Croton Joufra *Roxb.* Vern. *Mahudi*, Ass.; *Martu-arong* Mik.; *Maisinai*, Kach.; *Kharane*, Nep.; *Phepu-changne*, Duff.; *Dieng-Lamosuh*, Kh.; *Thaunang*, Manip.; *Inthap-ching*, Naga.

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.

3. Croton caudatus *Geisel.* Vern. *Dumi-shak*, Garo; *Lota-mahudi*. *Ghahe-lewa*, Ass.; *Matau*, Lush.; *Soh-Lam-brang*, Kh.; *Kum-Kum-arong*. Mik.; *Saphai-blai*, Synt.; *Rairang*, Kuki.

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, sub-coriaceous, 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

4. Croton Tiglium *Linn.* Vern. *Koni-bih*, Ass.; *Dieng-kymbat-lasam*, Kh.

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 JAINTIA 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.

Flrs. Hot season. Fr. Cold season.

5. Croton lævifolius *Bl.* Vern. *Dieng-Kharang, Dieng-Soh-riu*, Kh.; *Dieng-soh-kymphria*, Synt.

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 & JAINTIA HILLS, (4500-5,500 ft.).

Flrs. 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 ·4-·6 in. long. *Racemes* cymose, shorter than the leaves, slender. *Male flowers* ·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.

SYLHET, (Wallich No. 8,001 Sibpur). (F.B.I., Vol. V, p. 394).

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 ·4-·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 ·2-·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, ellipsoidal, densely stellate-hairy; style, spreading; ovules solitary in each cell, pendulous. *Fruit* triquetrous, shallowly 3-grooved, ellipsoidal, 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.

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 ·1-·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* diœcious or monœcious, fascicled in lax terminal or axillary panicled racemes; female in separate racemes or solitary in the male inflorescence. *Male flowers* ssepals 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.*

1. Ostodes paniculata *Blume* Vern. *Dieng-sa-la-shut-khlow*, Synt.; *Dieng-ja-tung*, Kh. *Tasichange*. Duff.

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 *Candoger.*

Trees, glabrous; branches divaricate. *Leaves* 2·2·4 in., broadly ovate, sub-oblong, shortly acute, shortly crenate, glaucescent beneath; base truncately 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.

ASSAM (Jaboka) (Prain No. 933). (Bull. Soc. France, 1919, LXVI, 287 (1920).

29. BLACHIA Baill.

Blachia umbellata *Baill.*

A shrub or a small tree, exuding milky 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 ·05 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 ·6-3·5 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 ·1-·25 in. long; sepals 5, valvate, covered with stellately hairy scales; petals 5, imbricate, ovate, ·1 in. long, membranous, green; stamens many; filaments glabrous, ·1-·16 in. long; anthers versatile. *Female flowers* pedicelled, in same cluster with male, solitary in each cluster; pedicels ·1 in. long. *Ovary* stellately tomentose, 3-celled; styles recurved; ovules 1 in each cell. *Fruit* 2-3 lobed, ·25-·4 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.

Flrs. Cold season. Fr. 4-5.

31. MANIHOT Tourn ex Adans.

Manihot utilissima *Pohl.* Vern. *Simal-alu,* Cach.; *Dieng-phan-kah,* Kh. Cassava.

A shrub. *Leaves* palmately 5-6 lobed, membranous, finely pubescent beneath; lobes oblanceolate, 3-7 by ·75-1·5 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.

M. Glaziovii *Muell. Arg. Ceara rubber*, Eng.

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.

A large evergreen tree. *Bark* greyish. *Leaves* 3-foliolate; leaflets entire, acuminate. *Flowers* monœcious, in large pubescent lateral panicles. *Perianth* simple, campanulate, 5-6 cleft. *Anthers* adnate to a central column. *Capsule* large, 6-valved, 3-lobed. *Seeds* spotted, shining.

Cultivated in N. C. Hills, (Lallacherra).
Yields the best caoutchouc of Brazil (Para rubber).

33. GELONIUM Roxb.

Gelonium multiflorum *A. Juss.* Vern. *Midoumabaphang*, Kach.; *Theng chek-te*, Kuki; *Martu-kelok-arong*, Mik.

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 ·75 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. CHÆTOCARPUS Thwaites.

Chætocarpus castanocarpus (*Roxb*) *Thwaites.* Vern. *Chambusi-buphang,* Kach.; *Bulkokra,* Beng.

A middle-sized evergreen tree. *Bark* greyish, warty, ·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 ·02-·3 in. long, *Flowers* diœcious, 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, ·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.).

Flrs. 11-12. Fr. 2-3.

35. BALIOSPERMUM Blume.

Shrubs or undershrubs. *Leaves* alternate, toothed or lobed, biglandular at the base. *Flowers* small, monœcious or diœcious, panicled or racemed; perianth simple. *Male* sepal 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 diœcious :—
  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. suffruticosum.*

1. Baliospermum montanum (*Willd.*) *Muell. Arg.*= B. axillare Bl. Vern. *Phan-thap.* Garo; *Phul-jelang.* Ass.: *Lasam-dumuin.* Kh.

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 & JAINTIA HILLS.

Flrs. & Fr. Throughout the year.

2. Baliospermum Meeboldii *Pax & K. Hoffm.*

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-setulosely pilose on both sides; lateral nerves

7-9 on either half; base acute or rounded, biglandular. *Flowers* monœcious. *Male* inflorescence axillary; peduncles 1·5-4 in. long, slender; flowers ·15 in. across; pedicels capillary, ·09 in. long; sepals orbicular, glabrous; stamens 14; disc glandular. *Female* inflorescence 1·5-3 in. long; flowers ·05-·12 in. across, somewhat bluish; pedicels capillary, ·09 in. long; sepals 5, ·09 in. long, lanceolate, acute, glabrous, accrescent, recurved; disc annular, hypogynous; *Ovary* glabrous; style short, rather thickened, bipartite. *Capsule* glabrous, tridymous, ·25 by ·17 in.

MANIPUR (3,500-4,5000 ft.). (Pflanzenreich IV. 147. VII. p. 414).

3. Baliospermum sinuatum *Muell. Arg.*

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, diœcious; 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

4. Baliospermum calycinum *Muell. Arg.*

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* diœcious, 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 & JAINTIA HILLS, (5,000 ft.).

Flrs. 9. Fr. 12.

5. Baliospermum micranthum *Muell. Arg.* Vern. *Thilli-ski,* Kh.

A slender herbaceous bush; young parts finely pubescent. *Leaves* 3-5 by ·5-2 in., lanceolate or oblong, acuminate, sinuate-toothed, coriaceous, membranous, glabrous; lateral nerves 8-16 on either half; base 2-glandular, acute or rounded. *Flowers* diœcious, panicled; pedicels capillary. *Male flowers* sepals orbicular, hyaline; disk of fleshy glands; stamens about 16. *Female flowers* sepals ovate-lanceolate. *Capsule* sub-globose, ·3 in. across, smooth, tridymous.

KHASI & JAINTIA HILLS, (4-5,000 ft.).
Used as vegetable.

Flrs. 6-9. Fr. Cold season.

6. Baliospermum suffruticosum *Pax & Hoffm.*

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* diœcious. *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.

Endospermum chinense *Benth.* Vern. *Bola,* Ass.: *Paklou-arong,* Mik.; *Haludchaki,* Cach.; *Thing-aiveng,* Kuki.

A tree. *Bark* greyish, fairly sessile; blaze pale yellow with brown granules. *Leaves* 2-7·5 in., alternate, broadly ovate or sub-orbicular, 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, diœcious, 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 ·5 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 panicled 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 subrhombic (1-2·8 in. long). .. .. *1. S. Sebiferum.*
Leaves long, ovate (2-4·8 in. long). .. *2. S. eugeniæfolium.*
Petiole-apex not glandular :—
Leaves entire, long petiolate, ovate or ovate-lanceolate. .. .. .. *3. S. baccatum.*
Inflorescence unisexual :—
Male calyx bifid; female 2-3 partite :—
Leaves long, elliptic or oblong-lanceolate, serrate (5·6-7·2 in.). .. .. *4. S. insigne.*

1. Sapium sebiferum *Roxb.* The Chinese tallow tree.

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.
The foliage somewhat resembles *Sissoo*.

Flrs. 6-8. Fr. 10-12.

2. Sapium eugeniæfolium *Ham.* Vern. *Dieng-sohmrit*, Kh.; *Korha*, Ass.; *Torso*, Mik.; *Simung-Puktu*, Abor.

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.

Flrs. 5-6. Fr. 10-1.

3. Sapium baccatum *Roxb.* Vern. *Seleng*, *Lawa*, Ass.; *Dieng-ja-long-ehr*, Kh.; *Sam-sim*, Garo; *Pantula*, Jharua; *Toor-arong*, Mik.; *Japhang*, Kuki; *Dhumra*, *Sarong-phang*, Mech; *Puktu-asing*, Abor; *Thing-bok-pui*, Lush.; *Boloch*, Cach.

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.

4. Sapium insigne *Benth.* Vern. *Mah-kola*, Ass.

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, inrounded 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, KAMRUP, NOWGONG.

Flrs. Cold season. Fr. Hot season.

38. EXCŒCARIA Linn.

Trees or shrubs, glabrous with acrid milky juice. *Flowers* diœcious or monœcious, in lateral axillary or terminal unisexual or androgynous spikes or racemes. *Perianth* 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. Excœcaria 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.

2. Excœcaria oppositifolia *Griff.* Vern. *Dieng-jam,* Kh.; *Dudhgoch,* Ass.; *Theng-bri,* Mik.

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 subserrate, 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. *Male flowers* sepal free; base auricled. *Female flowers* solitary. *Fruit* orbicular.

KHASI & JAINTIA HILLS, NOWGONG, SIBSAGAR, SYLHET.

The acrid milky juice is said to be violently poisonous and corrosive.

Flrs. 4. Fr. 12.

Excœcaria Sp. Nov. Vern. *Gammang-asing*, Abor.

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 fissues, ·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 accuminate, 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 monœcious, 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 :—
Bracts concealing the capsule :—
Bracts obscurely toothed, almost truncate, somewhat 3-nerved. .. .. 1. *A. indica.*
Bracts 3-lobed, obscurely 7-nerved. .. 2. *A. brachystachya.*

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.

ASSAM. (F.B.I., Vol. 5, p. 416).

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, ·06 in. across.

KHASI HILLS (upto 4,000 ft.). (F.B.I., Vol. V, p. 416).

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 diœcious; 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, ·5 in. across. *Seeds* ·25 in. across; testa crustaceous; cotyledons broad, flat; albumen fleshy.

N. E. F. TRACT, NAGA HILLS, CACHAR and KHASI & JAINTIA 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 & JAINTIA 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.

Alchornea tiliæfolia *Muell. Arg.* Vern *Lobong-long-arong,* Mik.

A shrub or a small tree; young parts minutely pubescent. *Bark* greenish grey. ·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, diœcious or monœcious; 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, ·5-·6 in. long, with purplish tubercles.

NOWGONG, N. C. HILLS, SYLHET and KHASI & JAINTIA 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.

ASSAM (Martin). (F.B.I., Vol. V, p. 420).

42. TREWIA Linn.

Trewia nudiflora *Linn.* Vern. *Merua*, Sylh.; *Thingchingel*, Lush.; *Marakur*, Kuki; *Mahou*, Mech.; *Bol-diktak*, *Bolno-khap*, *Jongchia*, *Arurong*, Garo; *Bhel-kol*, *Kenlo*, *Pithakuma-kendlow*, Ass.; *Thekijoy-arong*, Mik.; *Dieng-sohlyndot*, Kh.; *Panipitha*, Kach.; *Pithakuma*, Hajong.

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* dicœcious, 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.

Flrs. 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-valvad 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 :—
  Basal nerves 3 :—
    Leaves 4-9 in. long :—
      Capsule 3-lobed. .. .. 5. *M. philippinensis.*
    Leaves 2-4 in. long :—
      Capsule didymous. .. .. 6. *M. repandus.*

1. Mallotus albus *Muell.-Arg.* Vern. *Laru-bandha, Moralia,* Ass.; *Laimaguphu,* Kach.; *Napol-thing,* Kuki;

Dieng-laklia, 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* dicœcious, 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, papillose. *Capsule* usually of 4 cocci, muricate, with soft short tomentose processes. *Seeds* blackish-brown, minutely tuberculed.

Common throughout the Province.

Flrs. 2-3. Fr. Cold season.

2. Mallotus Roxburghianus *Muell. Arg.* Vern. *Bolthathu,* Garo; *Gurji-phang,* Kach.; *Khabi-lakoi,* Manip.; *Tamlai,* Naga; *Laidolor-bomphang,* Mech; *Arlak-arong,* Mik.; *Buri-tokon,* Ass.; *Dieng-long-kharai,* Kh. . .

. . 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 & JAINTIA HILLS.

Flrs. 12. Fr. 5.

3. Mallotus nepalensis *Muell. Arg.* Vern. *Dienglakhar*, 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-ovate 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, ovate-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, lanceolate, 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* pedicelled, 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.

5. Mallotus philippinensis *Muell. Arg.* Vern. *Bondauthu,* Kach.; *Sindure,* Nep.; *Yaduk-changne,* Duff.; *Jorat, Losan,* Ass.; *Dieng-chandon,* Kh.; *Sindur-phang,* Mech; *Arlak-arong,* Mik.; *Kage-em-bang,* Naga; *Bol-khing-khang,* Garo.

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, dicœcious. *Male flowers* clustered in erect terminal spikes which are often panicled, 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, papillose. *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.

6. Mallotus repandus *Muell. Arg.* Vern. *Konibih, Dudloti,* Ass.; *Rikhang-bong-long,* Mik.

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* diœcious, 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 companulate; 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 & JAINTIA HILLS.

Flrs. 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 diœcious, 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 :—
Capsule globose, echinate. .. 3. *M. Lowii.*

1. Macaranga denticulata *Muell. Arg.* Vern. *Dieng-lakhar,* Kh.; *Jaglo. Moralia,* Ass.; *Kapu,* Naga; *Bol-ajak* or *Chhagru,* Garo; *Laijigrao,* Kach.; *Jagrabish, Hajong, Jagura,* Cach.; *Mallata,* Nep.; *Lakoi,* Manip.; *Nakhar,* Lush.; *Madla,* Mech.; *Duging.* Abor and Miri; *Tajai (Taraun), Ejingba (Midu)* Mishmi; *Garawai.* Kach.; *Jagura,* Beng.; *Jhakura.* Sylh.

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, glaucescent 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.

2. Macaranga indica *Wight.* Vern. *Jaglo,* Ass.; *Dieng-lakhar,* Kh.; *Lobong-long-arong.* Mik.; *Boldotru* or *Sangrow,* Garo.

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 8-11 on either half above the basal pairs which are penninerved; 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.

3. Macaranga Lowii *King.* Vern. *Naga-jegeru. Phungi.* Ass.

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.

Cleidion javanicum *Bl.* Vern. *Theng-hogwai,* Mik.; *laktar-asing,* Miri; *Aron,* Cach.; *Theng-moite,* Kuki.

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 diœcious; 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, DARRANG, GARO HILLS, NOWGONG and KHASI & JAINTIA HILLS, MANIPUR.

Flrs. Cold season. Fr. Hot season.

46. HOMONOIA Lour.

Homonoia riparia *Lour.* Vern. *Hil-kadam,* Ass.; *Takit-asing,* Miri; *Lari, Panihelos,* Ass.; *Khau-waing-phang,* Kach.; *Ja-mynrei,* Kh.

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* diœcious, 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, ·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).

Flrs. 3-5. Fr. Rainy season.

47. RICINUS Linn.

Ricinus communis *Linn.* The Castor Oil Plant. Vern. *Kharanda.* Garo; *Inkiang,* Mik.; *Soh-rasam.* Kh.; *Radanphang,* Kach.; *Rallungbu.* Kuki; *Era-gach.* Ass.; *Verenda.* Beng.

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 laves. *Flowers* monœcious. *Stamens* numerous. *Ovary* 3-celled: style 3, plumose, 2-fid. *Capsule* globose, echinate, about ·5-·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.

Flrs. & Fr. Almost throughout the year.

48. CNESMONE Blume.

Cnesmone javanica *Blume.* Vern. *Lovi-sorot,* Ass.

A large evergreen twining shrub, tomentose with long villous hairs. *Leaves* alternate, 3-5 by 1·5-3 in., ovate-

oblong, acuminate, serrate or dentate, sub-coriaceous, tomentose on both surfaces; lateral nerves 4-6 on either half; base cordate; petiole ·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 ·5 in. long. *Capsule* of 4 globose cocci.

S. LUSHAI HILLS (2,500 ft. Wenger 327).

Flrs. 8. Fr. Cold season.

49. TRAGIA Linn.

Tragia involucrata *Linn.* Vern. *Bichuti,* Beng.; *Germa-dukha-guphu,* Kach.; *Jong-ma-sai,* Kuki.

A perennial twiner with hispid stinging hairs. *Leaves* alternate, variable, 1-4 by ·5-2 in., ovate or oblong, acuminate, serrate, membranous, hispid; lateral nerves 4-5 on either half, slender; base rounded or cordate; petiole ·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

cocci, ·3-·6 in. across, hispid. *Seeds* globose, obscurely hoary; albumen fleshy; cotyledons broad, flat.

N. C. HILLS and KHASI & JAINTIA HILLS (2,500 ft.).
Flrs. 6-8. Fr. 8-10.

50. PTEROCOCCUS Hassk.

Pterococcus 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 stellately 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.

Codiæum variegatum *Bl.*

An evergreen shrub with brightly coloured curiously shaped variegated leaves; generally known as *Crotons;* cultivated in gardens everywhere.

FAM. 124. ULMACEÆ.

Engl. in Engl. u. Prantl. iii. 1.59. (Urticaceæ, tribes 1. Ulmeæ, II. Celtideæ. Gen. Pl. III 343).

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 , sepaloid. *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 penni-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 ·05-·16 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, SIBSAGAR and K. & J. HILLS, (upto 5,000 ft.).

Wood cream coloured. Leaves are cattle fodder.

Flrs. Cold season. Fr. 3-5.

2. HOLOPTELEA Planch.

Holoptelea integrifolia *Planch.* Vern. *Laphang.* Jharua.

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 oblong, 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* isomerous. *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.

Drupes 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.*

1. Celtis australis *Linn.* Vern. *Dieng-soh-thang-chi*, Khasi; *Theng-pi-bichurang-arong*, Mik.; *Mohita*, Ass.; *Bonridn*, Kach.; *Thing-sakngar*, Kuki.

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 ·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 ·1-·3 in. long; stipules ·3 in. long, subulate, caducous. *Sepals* 4-5. *Ovary* sessile. *Drupe* ovoid or ellipsoid, ·3 in. long, more or less rugose, woolly at the base; peduncles ·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.

C. australis *Linn.* Var. eriocarpa DC. Vern. *Bonridin*, Kach.; *Kongnal*, Kuki.

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.

2. Celtis tetrandra *Roxb.* Vern. *Bura*, Cach.; *Phatong*, Mech; *Bol-kerasru*, *Bol-chhek*, Garo; *Huktaptia*, *Noni-bhola*, *Mouhita*, *Hukotia*, *Mirihukuta*, Ass.; *Theng-pishithi-lornarong*, Mik.; *Dieng-chini*, Khasi; *Dieng-ja-lipiar*, *Dieng-intiar*, Syn.; *Tamagasing*, Miri; *Pomid-asing*, Abor.

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 subentire, 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; tertiaries strong, scalariform; base oblique, rounded or acute; petiole ·05-·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 upto 3.000 ft.

Flrs. 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 yellod, 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.

Flrs. 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.

Gironniera reticulata *Thw.* Vern. *Dieng-charkhei.* Khasi.

A large evergreen tree (80′/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 panicled 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, diœcious, 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.*

1. Trema orientalis *Bl.* Vern. *Phakram*, Garo; *Phakdima*, (Sadiya) *Jopang*, *Jhupon*, *Sobaigoch*, Ass.: *Gunali*, Sylh.; *Belphur*, Lushai; *Hattou*, Kuki; *Phadam*, Mech; *Rampak-arong*, Mik.; *Phaslang*, *Tum-lisha-phang*, Kach.; *Dieng-lang-ta*, Kh. *Kunhel*, Nep.; *Alo*, *Lalong*, *Dalaw-asing*, Miri; *Alo-asing*, Abor; *Sabai-gos*, Lakhimpur: *Machmai*, Darrang; *Yalu-changne*, Daff.; *Dieng-lattar*, Synt.; *Jinggini*, Kach.; *Tithu* (*Taroan*), *Atom* (*Midu*) Mishmi.

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.

2. Trema amboinensis *Bl.* Vern. *Phadam-jola*, Mech.

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.

(Engl. in Engl. u. Prantl III 1. 66. Urticaceæ, tribes IV, Moreæ V. Artocarpeæ VI. Conocephaleæ, Gtn. Pl. III. 344).

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, monœcious 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. Ficus.**
    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 diœcious. *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 :—
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. Eusyce.
(*ii*) Receptacle mostly in fascicles from stem or branches. .. 6. Neomorphe

Section Synæcia is not represented in Assam.

(After King P., XI Annal. R. B. Garden, Calcutta, Vol. I).

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 ·5 in. across or more :—
Stipules small :—
Leaves narrow-elliptic, oblong. .. 9. *F. rhododendrifolia*
Receptacle less than ·5 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 cordate. .. .. .. 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. cross 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. semicarpa.*
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; tomentose 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. .. 28. *F. hirta.*
Young parts sparsely hairy :—
Leaves entire or nearly so :—
Receptacle pedunculate lengthening out into a stalk :—
Gradually constricted. .. .. 29. *F. pyriformis.*
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 receptacle; male flowers 2-3. .. 33. *F. nemoralis.*
Creeping or ephiphytic :—
Leaves ovate, rotund, pubescent or puberulous, membranous :—
Receptacle long pedunculate. .. 34. *F. lævis.*
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 solitary, globose or ovoid, hairy, ·3-·8 in. across. .. .. .. 36. *F. foveolata.*
Receptacle solitary or clustered, glabrous, orange-red when ripe, ·2-·5 in. 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.*

1. 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 greenish. *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 coriaceous, 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. *Receptacles* yellowish when ripe, ·25-·3 in. across, pedunculate, globose or pyriform, minutely hairy and verrucose, rather scabrid with few basal bracts below the puduncle 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.

Flrs. 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 diœcious 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.

Flrs & 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; stamen 1, joined to a pistillode. *Female flowers* perianth 3-fid; style short, diverging. *Achene* obliquely ovoid.

KAMRUP, K. & J. HILLS.

Flrs. 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 ærial 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, GARO HILLS and K. & J. HILLS (upto 3,000 ft.).

Flrs. Cold season. Ripe fruit 4-8.

5. Ficus altissima *Bl.* Vern. *Gadgubar*, Ass.: *Dhop*, Mech.

An enormous spreading tree, with ærial 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-tharlat*, 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 ·25 in. across, orange-coloured when ripe, pedunculate; peduncle ·3-·6 in. long; basal bracts 3, deciduous, pubescent. *Achenes* viscid.

N. E. F. TRACT, CACHAR, K. & J. HILLS (5,000 ft.).

Fr. Cold season.

6. Ficus obtusifolia *Roxb.* Vern. *Kathal-patia-bor, Kothalua-jari,* Ass.; *Dieng-surisoh,* Khasi; *Hnalhul,* Lushai; *Lewa, Phakri,* Mech; *Swet-bot,* Sylh.

A large tree, glabrous, often epiphytic. *Bark* greyish, thin, rough; blaze light-red, exuding sticky milky juice. *Leaves* 2-·5-7·5 by 1·3-·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 ·3-·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 ·7 in. across; basal bracts 3, coriaceous, cordate. *Achene* ovate, rotund, viscid.

GOALPARA, GARO HILLS, SIBSAGAR and SYLHET, K. & J. HILLS.

Fr. Cold season.

7. Ficus elastica *Roxb.* India rubber tree. Vern. *Atha-bor,* Ass.; *Chang-krang,* Duff.; *Dieng-juri,* Khasi; *Phrap-ramkhet,* Garo; *Dewak-arong,* Mik.; *Ka-jiri-lua,* Synt.

A gigantic tree, quite glabrous, sending down numerous aerial roots; trunk strongly buttressed, usually epiphytic under natural conditions. *Leaves* 5-12 by 2-5·5 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 ·5-2·5 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.

8. Ficus Benjamina *Linn.* Vern. *Jari.* Ass.; *Ratke-asing*, Abor: *Thing-jaman*, Lushai; *Phrap-rakseng*, Garo; *Dieng-jiri*, Khasi.

A large tree, spreading, with drooping branches, epiphytic in early life. *Leaves* 1·5-4 by ·5-2 in., ovate-elliptic or elliptic, entire, acuminate, thinly coriaceous, glabrous, shining above; lateral nerves slender, numerous, anastomising into an intramarginal nerve; petiole ·4-·8 in. long; stipules lanceolate, about ·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 ·4 in. across. *Achene* more or less reniform.

Gauhati (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 ·7 in. across; perianth segments not spathulate.

Plains of ASSAM, KAMRUP (G. Mann).

Flrs. 1. Fr. 4.

9. Ficus rhododendrifolia *Miq.* Vern. *Lata-jari*, Ass.

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.

Var. affinis. Vern. *Dieng-kachiri*, Synt. Epiphytic (on Quercus dealbata). *Bark* grey, warty, ·5 in. thick; inside brownish, fibrous; wood yellowish. *Leaves* ovate-lanceolate, acuminate, shining, narrowed to the petiole. *Receptacle* purplish black when ripe, pedunculate.

GARO HILLS & KHASI HILLS (upti 3,000 ft.).

Flrs. Cold season. Fr. End of hot season.

11. Ficus retusa *Linn.* Vern. *Thapsi* or *Phrapsi*, Garo; *Silubor*, Ass.; *Chiri*, Mik.

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, oblanceolate. *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).

12. Ficus nervosa *Roth.* Vern. *Thebu-arong*, Mik.; *Khari-pati-dimaru*, Ass.; *Uitebuk*, Tipp.; *Dieng-rop-thang*, Khasi; *Bol-chhap*, Garo.

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.

Flrs. 10-12. Fr. Hot season.

13. Ficus Rumphii *Bl.* Vern. *Bot*, Sylh. *Pakhri-bor*. Ass.; *Chiri-pipli*, Mik.; *Phrap-rakseng*, Garo.

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. *Laves* 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 ·5-1 in. long, ovate-lanceolate. *Male flowers* few near the mouth of the receptacle; perianth segments spathulate; stamen 1. *Female* and *Gall flowers*-perianth segments 3, lanceolate; ovary ovoid, smooth; style elongate; stigma clavate. *Receptacle* sessile, in axillary pairs, globose, ·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.

14. Ficus religiosa *Linn.* The Pipul tree. Vern *Phrap-thibrong*, Garo; *Paikor*, E. Bengal. *Asvattha*, Beng. *Pippala*, Sans.

A large deciduous tree, usually epiphytic; trunk irregularly shaped. *Bark* greyish with brownish speeks. *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.

15. Ficus infectoria *Roxb.* Vern. *Dieng-soh-poklao*, Khasi; *Chiri-arong*, Mik.; *Dieng-chiri*, Synt.; *Tengabor*, Kamrup.

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.

16. Ficus geniculata *Kurz.* Vern. *Phrap-agar*, Garo; *Phrap-so*, Kach.; *Tanga-bor*, Ass.

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.

17. Ficus clavata *Wall.* Vern. *Samch-blang. Dieng-soh, sormeblang-synrang*, Khasi.

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.

18. Ficus sikkimensis *Miq.* Vern. *Daljhuri*, Ass.; *Jiri-aka*, *Sutarapke-tarug*, Duff.; *Thiwek*, Garo.

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-·75 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-obovate, 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.

21. Ficus heterophylla *Linn.* Vern. *Bolowa,* Sylh.

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 gamophyllous, 3-4-fid; monandrous. *Gall flowers*-perianth similar; ovary smooth; style short, lateral. *Female flowers*-perianth gamophyllous, 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* subglobose, 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.

Var. scabrella. Vern. *Soh-symmch-blang-sur,* Khasi.

Leaves shortly petiolate, narrow, not lobed. *Receptacle* shortly pedunculate, globose or sub-pyriform.
K. & J. HILLS.

Var. repens. Vern. *Turag-riube,* Abor; *Konai-dimoru,* Ass.

Leaves long petiolate, broad. *Receptacles* long pedunculate, more or less pyriform.

N. E F. TRACT, DARRANG & NOWGONG.

22. Ficus rostrata *Lamk.* Vern. *Panthak.* Garo; *Khuntia-bor,* Ass.; *Chiri-hechu,* Mik.

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. *Receptactes* 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.

Flrs. Cold season. Ripe fruit 4.

23. Ficus Sæmocarpa *Miq.* Vern. *Phunkhu-jhola*, Mech; *Jamynrei*, Khasi.

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.

24. Ficus hispida *Linn.* Vern. *Dumni*, Jharua; *Khoksha-dumuru*, Mech; *Panthap*, *Thiwek*, Garo; *Sakhi-bongbok-then*, Kuki; *Dieng-lapong*, Khasi; *Dumoru*, Ass.;

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, ·5-2 in. long; stipules ovate-lanceolate, about ·5 in. long, pubescent externally, numerous in one set of receptacles containing gall flowers. *Male flowers*-tepal 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, ·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 large; 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.

25. Ficus Cunia *Ham.* Vern. *Takuk-asing*, Miri; *Soh thorling*, *Dieng-duit-lasas*, Khasi; *Kongrou*, Manip.; *Theiti*, Lushai; *Thei-chang*, Tipp.; *Thai-khrau*, Mech.; *Aminsep*, Garo; *Dieng-jabo*, *Dieng-thylliang-sang*, Synt.

A middle-sized or small tree; young shoots hirsute. *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.

26. Ficus prostrata *Wall.* Vern. *Dieng-doit-saw*, Khasi: *Thimisep-sangoppa*, Garo.

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.

27. Ficus fistulosa *Reinwdt.* Vern. *Kathia-dimaru, Mou-dimoru.* Ass.; *Ka-lapong,* Khasi.

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-oblong 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 cylindric. *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-pyriform, glossy green when young, depressed globose, glabrous with pale green speckles, ·5-1 in. across; basal bracts 3. *Achene* obliquely ovoid, minutely tubercled.

LAKHIMPUR, SIBSAGAR, CACHAR and K. & J. HILLS.

Flrs. 2-3.

28. Ficus hirta *Vahl.* Vern. *Dieng-soh-rompian,* Khasi; *Indew-ching,* Naga; *Khandou-jalla-phang,* Kach.; *Chhakhab,*

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-·75 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 ·5-1 in. across. *Leaves* ovate, rotund, often deeply lobed.

KHASI HILLS.

29. Ficus pyriformis *Hk. & Arn.* Vern. *Soh-doit-um, Ja-myn-rei-synrang*, Khasi.; *Khuaishi-phang*, Kach.; *Dieng-ja-lakhma*, Synt.

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. Sub-pyriformis. *Leaves* linear-lanceolate, pebescent beneath. *Receptacles* and peduncles pubescent.
KHASI HILLS, ASSAM.

Var. ichnopoda. *Leaves* glabrous. *Receptacle* glabrous: peduncle elongated.

SYLHET, LUSHAI HILLS, LAKHIMPUR & K. & J. HILLS.

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.

31. Ficus silhetensis *Miq.* Vern. *Soh-syrmch-blang, Dieng-sormeblang,* Khasi; *Bhuin-khannah,* Nep.

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., oblanceolate, elliptic-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*-tepals 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.

32. Ficus lepidosa *Wall.* Vern. *Dimoru,* Ass.; *Inglearong,* Mik. *Dieng-ka-japo, Dieng-thalliang,* Khasi; *Mumukichok,* Naga; *Bolmetap, Bol-khan-thap,* Garo; *Dumru-jola,* Mech.

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*-tepals 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, ellipsoid, 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).

33. Ficus nemoralis *Wall.* Vern. *Dimoru*, Ass.; *Soh-rom-blang*, Synt.; *Dieng-surme-blang*, Khasi; *Katia-dimoru*, Lakhimpur.

A small handsome tree. *Bark* thin, greyish-brown, fairly smooth, glabrous. *Leaves* 2-6 by ·6-2·5 in., slightly inequilateal, 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, rotund.

LAKHIMPUR, SIBSAGAR and K. & J. HILLS (upto 5,000 ft.). Fruit edible. The leaves are lopped for cattle fodder.

Ripe fruit cold season.

Var. Fieldingii *Miq.* Vern. *Soh-kyrmet-blang*, Khasi. *Leaves* narrow 2-6·5 by ·8-2·3 in., bifarious, long acuminate. *Receptacle* shortly pedunculate.

KHASI HILLS (Nos. 7399 & 5988, U. N. Kanjilal).
Fodder for goats.

34. Ficus lævis *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-pyriform. ·5-1 in. across, greenish-yellow when ripe; umbilicus broad; basal bracts 3, small; peduncles ·6-1 in. long. *Achene* globular 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.

35. Ficus scandens *Roxb.* Vern. *Khram-barat,* Garo; *Bongpur doukha,* Kach.; *Lata-dimaru,* Ass.

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 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 1, 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.).

Flrs. Hot season. Ripe fruit. Rainy season.

36. Ficus foveolata *Wall.* Vern. *Ka-jiri-sim*, Synt.; *Soh-kyrmoit-kroh*, Khasi.

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. oleæformis 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 ·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, ·25-·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 ·5-1·25 in. long, hirsute: stipules flaccid, linear-lanceolate, ·6-1·4 in. long. *Male* and *Gall flowers* unknown. *Female flowers* perianth of 4 peices enveloping the pistil except the stigma; style short, subterminal; stigma large, lanceolate. *Receptacle* ·3-·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.

ASSAM. (No specimen in Forest Herbarium, Shillong). F. B. I. Vol. V., P. 529.

39. Ficus Roxburghii *Wall.* Vern. *Mondimaru, Autha-dimaru,* Ass.; *Thaibar-phang,* Kach.; *The-bol.* Garo: *Kukbal-takuk-asing,* Miri; *Dieng soh-shied, Dieng-soh-lampin,* Khasi; *Lothebi-arong,* Mik.; *Nai-milay-thing,* Kuki.

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 ·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 ·5-·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 ·6-1 in. long; stipules ·6-·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 panicled fascicles from the trunk and larger branches, rarely axillary, sub-globose or pyriform, reddish or organge when ripe, 1-1·5 in. across; basal bracts 3, small, triangular, ovate. *Achene* minutely tubercled.

Common throughout the province (upto 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 ·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 ·4-1 in. long; stipules about ·5 in. long, lanceolate. *Male flowers* shortly pedicelled, 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,

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 ·2-·4 in. long; stipules lanceolate, convolute, ·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. Fischer.*

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 ·4-1·75 in. long, shallowly channelled; stipules ·4-·5 in. long, lanceolate, acuminate, glabrous. *Male flowers*—pedicel ·4-·5 in. long; perianth segments 3, ·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, ·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 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.

Delai Valley (Kingdon Ward 8224). (Kew Bulletin 1936, p. 282).

Flrs. 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-sram.* 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; apice 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.

Flrs. 3-4. Fr. Rainy season.

Artocarpus integra *Thunb.* (1776) Syn. Artocarpus integrifolia Linn. (1781). Vern *Jang-phong-arong*, Mik.; *Dieng-soh-phan*, Khasi; *Kathal*, Ass., Beng. The jack fruit tree.

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 ·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.

3. Artocarpus Lakoocha *Roxb.* Vern. *Tat-tak*, Kuki; *Dewa-cham*, Sylh., Cach; *Dewa-sali*, *Bohot*, ;Ass.: *Heiru-kothong*, Manip.; *Liusik-salia*, Miri; *Tatte*, Tipp.; *Armu*, Garo; *Dieng-soh-ram*, Khasi.

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* ·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 ·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.

4. Artocarpus Gomeziana *Wall.* Vern. *Sonapaticham*, Sylh.; *Tat-pong*, Tipp.; *Kharika-dewa*, Ass.

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, ·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* diœcious, 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*-tepal 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 pseudo-carp 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.*

1. Cudrania javanensis *Trecul.* Vern. *Puli-kaint,* Ass.; *Takum-asing,* Miri; *Pumi-leki,* Daff.; *U-sia-kiang, U-ther-sia-hati,* Khasi; *Bopou-chuni,* Mik.

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-obovate 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.

2. Cudrania fruticosa *Wight.* Vern. *Dieng-shikthnat*, Synt.

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.

Conocephalus suaveolens *Bl.* Vern. *Khung-khai*, Tipp.; *Gabang-lota*, *Lata-dimeru*, Ass.; *Dudiblok*, Garo; *Agig-riube*, Mik.

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, spathulate; 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* monoecious 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. lævigata.*

1. Morus acidosa *Griff.* Syn. Morus indica *Linn.* Vern. *Kiskuri*, Kamrup; *Bomphang-rakhep*, Mech: *Nuni* Ass.; *Sohlong-dykhur*, Khasi.

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.

2. Morus serrata *Roxb.* Vern. *Dieng-soh-tungkhar*, Khasi.

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.

Flrs. 3-5. Fr. 6-9.

3. Morus lævigata *Wall.* Vern. *Anum-asing*, Miri; *Ayum-asing*, Abor; *Bola*, Ass.; *Anga-taya-changne*, Duff.; *Pong-ray-baphang*, Kach.; *Dieng-bylliet*, Khasi; Boula, Mech; *Rokseng*, Garo; *Pantha-thing*, Kuki; *Dieng-tieng-lyer*, Synt.; *Repsing*, Rabha.

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 papillose 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.

Flrs. 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* diœcious, 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.

Flrs. 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, denetate, subcoriaceous, glabrous; lateral nerves 6-8 on either half; base rounded or truncate; petiole ·2-·5 in. long; stipules deciduous. *Flowers* diœcious. *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.

Pseudostreblus indica *Bureau.* Vern. *Dieng-lundoum,* Khasi; *Dudh-chapa,* Cach.; *Dieng-ka-chiri-khlaw,* Synt.

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* monoecious, 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.

Streblus asper *Lour.* Vern. *Kharanchi-bol,* Garo; *Khorua,* Ass.; *Chiri-hetso,* Mik.; *Scora,* Mech; *Dieng-sohkhyrdang,* Khasi; *Sherphang,* Kach.

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.

Taxotrophis caudata *Hutchinson*. Burm. II (464). For Fl. Brit. Syn. T. zeylanica Hook f. F.B.I. V. P. 488 partim; Kurz.

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 nerved; 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.

Cannabis sativa *Linn.* Vern. *Bhang, Jangli-bhang.* Ass.

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 Pharmacopæas.

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; pistillode 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-phyllous 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.**

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 penicellate:—
Leaves white or grey beneath. **10. Debregeasia.**
Female perianth 0 :—
Young shoots silky :—
Leaves white felted beneath. .. **11. Maoutia.**

URTICA Linn.

Urtica parviflora *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* monœcious, 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

2-fid. *Cymes* 6-14 in. long, lax; branchlets and pedicels recurved. *Male* and *female* on the same clusters. *Male* 4-5-merous. *Female* perianth cupular, 4-lobed. *Ovary* oblique. *Achene* oblique. *Seeds* nearly exalbuminous.

KHASI HILLS (Griffith).

Flrs. & Fr. Autumn.

2. LAPORTEA Gaud.

Trees, shrubs or herbs with (sometimes very minute) stinging hairs. *Leaves* alternate, entire or toothed, palminerved or penninerved; stipules free or connate. *Flowers* monœcious or diœcious, 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. .. *1. L. crenulata.*
A tree. .. *2. L. pterostigma.*

1. Laportea crenulata *Gaud.* Vern. *Khoma or Phoma,* Mech; *Gilmat-jakma,* Garo; *Germa-yung,* N. Cach.; *Dieng syn-rem,* Khasi; *Phaji,* Miri; *Paji,* Abor.; *Kermaphang* Kach.; *Tarmepi-arong, Bap-kangsan,* Mik.; *Thlak-pui,* Lushai; *Laua-chutra,* Sylh.; *Thakpui-kung,* Tip.; *Torash, sorot-gach,* Ass.

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.

2. Laportea pterostigma *Wedd.* Vern. *Paji-asing*, Miri; *Paso-gilong*, Abor.; *Tarme*, Mik.; *Phepha-soroth*, Ass.; *Son-rem*, Khasi.

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, palminerved; 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.

Girardinia heterophylla *Dcne.* Vern. *Taintham*, *Tingthap*, Khasi; *Paji-jimang*, Miri and Abor.; *Ing-geo*, Kach.

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* 4merous, 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 (Sibsagar) 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; dicœcious. *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 floders* tepals 3 rarely 4. *Ovary* straight; stigma sessile, penicellate. *Achene* ovoid, compressed, ·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* ·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.*

Lecanthus Wightii *Wedd.*

A small succulent herb *Leaves* opposite, 2-2·5 by ·5-1 in., ovate, somewhat oblique, acute or shortly acuminate, dentate, membraneous, 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, monœcious or diœcious, crowded on sessile or pedunculed 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, spathulate 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.

Elatostema sessile *Forst.* Vern. *Ja-u-e*, Khasi.

Shrubby, usually pubescent, 6-8 ft. high; stem woody, hollow, often climbing. *Bark* blackish-green. *Leaves* 3-7 by 1-1·5 in., oblanceolate, 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-·5 in. long, cystoliths crowded.
K. & J. HILLS (4,500 ft.).

Flrs. 3.

E. sesquifolium *Hassk.* A branching undershrub; lower parts woody. *Leaves* 3-10 by 1·2-2 in., oblong-elliptic or elliptic-lanceolate, quite entire, caudate-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.

Flrs. 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. *Achene* ovoid.

KHASI HILLS & NAGA HILLS (upto 6,000 ft.).

Flrs. & 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. procridioides *Wedd.*, E. decipiens *Wedd*, E. surculosum *Wight*, E. obtusum *Wedd.* and E. cornutum *Wedd.*

Procris Wightiana *Wall.*=Procris lævigata Blume. Vern. *Ja-leiwah*, Khasi.

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 oblanceolate, 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. *Achene* ovoid, slightly compressed.

K. & J. HILLS, MISHMI HILLS (Griffth.) & MANIPUR (Clarke) upto 4,000 ft.

Flrs. 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. sidæfolia.*
Flowers-clusters arranged in simple or panicled 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.*

1. Bœhmeria malabarica *Wedd.* Vern. *Dieng-thyn-rait, Dieng-soh-khar,* Khasi; *Sam-khul-khra, Borthur-thuri,* Garo; *Banchak-arong,* Mik.; *Tan-ngam, Maurasha-baphang,* Kach.; *Sukhrup,* Tipp.

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.

Flrs. 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 (upto 4,000 ft.) & MISHMI HILLS (Griffith).

Flrs. & Fr. Cold season.

3. Bœhmeria nivea *Hook. et Arn.* The Rhea plant Vern. *Riha*, Ass.

A shrub with herbaceous branches, tomentose. *Leaves* 2-6 by 1·5-1 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, monœcious, 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).

Flrs. & Fr. Cold season.

4. Bœhmeria macrophylla *Don.* Vern. *Dieng-soh-khasim, Dieng-soh-khva,* Khasi.

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.).

Flrs. 8-9. Fr Cold season.

B. macrophylla Var. Listeri Gage. Leaves smaller, 2-6 in. long; spikes densely fascicled in the axils.

DARRANG.

Flrs. & Fr. Cold season.

5. Bœhmeria platyphylla *Don.* Vern. *Yampi-yammi-asing.* Miri; *Labit-iong.* Khasi.

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.

6. Bœhmeria Hamiltoniana *Wedd.* Vern. *Soh-byrthied-kyrteng, Soh-synthap.* Khasi.

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. Bœhmeria 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 ruguose above, hoary-tomentose (finely) beneath; base rounded, 3-nerved; petiole ·7-1·5 in. long; stipules connate. *Diœcious 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).

Flrs. 8.

7. POUZOLZIA Gaud

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 :—	
Stamens 4. Leaves alternate.	1. *P. viminea.*
Lobes of male perianth abruptly inflexed about the middle and angled; buds truncate :—	
Stamens 5. Leaves opposite.	2. *P. hirta.*

1. Pouzolzia viminea *Wedd.* Vern. *Misagi-jollaphang,* Kach.; *Khojo,* Rabha.

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.

P. viminea *Wedd.* Var. fulgens Wedd. Vern. *Misagidukha,* Kach.

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.

2. **Pouzolzia hirta** *Hassk.* Vern. *Jamynsleh,* Khasi.

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, apterous or 2-3-alate.

K. & J. HILLS 5,500 ft.
Roots are used as hair wash.

Flrs. 7-10. Fr. Cold season.

P. hirta *Hassk.* Var. P. quinquenervis Benth. Basal nerves usually 5.

K. & J. HILLS (5,000 ft.). G. Mann.

Flrs. 7.

P. Bennettiana *Wight.*

Herbaceous; stem erect, pubescent. *Leaves* 3-5 by ·8-1 in., lanceolate, acuminate, puberulous; base rounded; petiole very short. *Male flowers* almost glabrous, in axillary clusters. *Stamens* 5. *Fruit* costate.
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.*

An erect very slender herb, 2-3 ft., in height, scarcely branched. *Leaves* 2·5-4·5 in., ovate caudate acuminate. *Flowers* in bracteate androgynous clusters. *Male flowers* perianth tubular 2-3-fid, valvate; pistillode woolly. *Female flowers* perianth ovoid tubular 2-toothed; stigma deciduous. *Achene* ·1 in. long, ovoid beaked

ASSAM (Jenkins).

Flrs. & Fr. 7-10.

8. SARCOCHLAMYS Gaud.

Sarcochlamys pulcherrima *Gaud.* Vern. *Dienglangshir, Dieng-soh-khwa-lali,* Khasi; *Bangri, Luthi,* Sylh.; *Sanmari,* Manip.; *Kongloidon,* Tipp.; *Adung-umra,* Mech.; *Mesaki,* Ass.; *Misagi-phang,* Kach.

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* diœcious; 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 intra-petiolar. *Flowers* usually diœcious, 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.*

1. Oreocnide integrifolia *Miq.* Syn. Villebrunea integrifolia *Gaud.* Vern. *Khilkhra*, Garo; *Tillejuat, Dieng-teingbah*, Synt. and Khasi; *Thehoy-arong, Inthumabab-arong*, Mik.; *Chho-oi-paroli*, Ass.; *Dieng-jei-thang-sim*, Khasi; *Thing-khra-phang, Khem-khratong-baphang*, Kach.; *Ijakthing*, Kuki; *Bonrhea*, Sib.; *Horhuta*, Sylh.; *Sejugbu*, Lushai.

A small evergreen tree; young parts pubescent or tomentose. *Bark* greyish, warty with lenticels. ·16 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 ·5-1 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.
Flrs. 1-3. Fr. 10-11.

2. Oreocnide frutescens *Miq.* Syn. Villebrunea frutescens Bl.

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 pustulate above, softly pubescent beneath and mottled whitish; 3-nerved at base, penni-nerved in the upper half; base obtuse, rounded or shallow-cordate; petiole ·3-1·1 in. long; stipules upto ·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. acrosss. 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* monœcious or diœcious, in compact panicled 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 upto 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.*

1. Debregeasia longifolia *Wedd.* Syn. Debregeasia velutina Gaud. Vern. *Bayo-asing, Dalah-asing,* Miri and Abor.; *Soh-sinting, Soh-tyrsim, Stein-la-doh,* Khasi.

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.

3. Debregeasia dentata *Hk. f.* Vern. *Lebang*, Lushai.

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, cuspidate, 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.

4. Debregeasia Wallichiana *Wedd.* Vern. *Dieng-laramphang*, Khasi; *Lek-pangara*, Nep.; *Dieng-sha-pallang*, Synt.

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 diœcious, 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 ·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 (drupe) .. **1. Juglans.**
Female flowers spicate :—
Bracts produced into a wing in fruit (Nut). .. .. .. **2. Engelhardtia.**

1. JUGLANS Linn.

Juglans regia *Linn.* Vern. The walnut. Vern, *Akhrot.* Beng. and Hind.

A large aromatic deciduous tree; shoots velvety. *Bark* grey, longitudinally fissured. *Leaves* imparipinnate, 6-15 in. long, thickly tomentose when young. *Leaflets* 5-13, subsessile, opposite or sub-opposite, 3-8 by 2-4 in., elliptic-oblong, 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 anthelmentic 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.

Flrs. 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, subsessile 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 nerved bract with mid-

lobe exceeding the lateral; epicarp or calyx thin, glandular-hirsute; endocarp 2-valved.

(Brandis has combined E. spicata *Bl.* E. acerifolia *Bl.* and E. Colebrookiana *Lindl.* as E. spicata *Bl.* p. 620, Indian Trees. I have followed Hooker, F. B. I., p. 595-96, Vol. V).

Nuts villous :—		
Leaflets sub-opposite petiolulate. pubescent. 2-8 in. long, ultimately :—		
Middle bracts upto 3 in. long :—		
Female spike 6-13 in. long.	..	1. *E. spicata.*
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.	..	2. *E. Colebrookiana.*
Nuts hispidly hirsute; leaflets sessile. 5-7 in. long; nerves beneath tomentose.	..	3. *E. acerifolia*
Nuts glabrous :—		
Male flowers in terminal spikes :—		
Leaflets elliptic or oblong :—		
Exocarp glabrous.	.. ..	4. *E. polystachya.*
Male flowers in panicled spikes :—		
Leaflets sub-falcately lanceolate or elliptic :—		
Exocarp clothed with golden scale.	..	5. *E. Wallichiana.*

1. Engelhardtia spicata *Blume.* Vern. *Wakru. Bolsne*, Garo; *Lal-amiri. Lewa.* Ass.; *Jabha.* Kamrup; *Marlearong.* Mik.; *Tappa-changne.* Tipp.; *Dieng-lamba. Dieng-lyba*, Khasi; *Dieng-duba.* Synt.

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 carving.

Lac is raised on this tree by Garos. Bark is also used to intoxicate and kill fish.

Flrs. 11-12. Fr. 3-4.

2. Engelhardtia Colebrookiana *Lindl.* Vern. *Pasomasi, Ja-masi, Deing-parso-masi.* Khasi; *Dieng-chim,* Synt.

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 subsessile, linear-oblong, entire or serrate; petiole and nerves beneath tomentose. *Nut* hispidly hirsute.

K. & J. HILLS, (Griffith).
(F.B.I., Vol. V., p. 596 possibly only a form of *E. spicata Bl.*).

4. Engelhardtia polystachya *Radlk.* Vern. *Lewa, Chhal-bih*, Ass.; *Phekphe*. Tipp.; *Rudek*, Garo; *Dieng-byntal, Dieng-btah*, Khasi; *Mowa*, Nep.; *Tamukchangne*. Duffla; *Suriarong*, Mik.; *Saribang-ching*, Naga; *Sarong-phang*, Kach.; *Dieng-kapta*, Synt.

A middle sized or large tree (upto 100'/70"); stem fluted. *Bark* dark-brown, roughly and longituninally 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 ·05-·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.

5. Engelhardtia Wallichiana *Lindl.*

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); petiolulue ·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, ·15 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.

K. & J. HILLS—Umsaw.
Fr. 7.

FAM. 128. MYRICACEÆ.

Aromatic trees or shrubs, monœcious or diœcious. *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.

Myrica Farquhariana *Wall.*. Syn. Myrica Nagi Thunb. Vern. *Soh-phli*, Khasi; *Naga-tenga*, Ass.

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 catarrah 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).

1. Casuarina eqisitifolia *Forst.* Beef-wood tree. 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 ·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, ·5-·75 in. long. *Seeds* with wing ·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 monœcious (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. *Ovary* 3-celled; style 3; ovules 2 in each cell. *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.

Ovary 3-celled :—
  Nut 1 :—
    Cupule cup-shaped, not enclosing the nut :—
      Stamens 6, leaves serrate. .. .. **1. Quercus.**
    Cupule entirely covering the nut:—
      Stamens 12; leaves entire not spinous **2. Pasania.**
  Nut 1-4 :—
    Involucre completely enclosing the nuts, spinous or tuberculous. .. .. **3. Castanopsis.**
Ovary 6-celled :—
  Flowers in 3; nuts enclosed in the spinuous involucre. .. .. .. **4. Castanea.**

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. .. .. 1. *Q. semecarpifolia.*
    Glans elongate, ovoid; leaves coarsely dentate-serrate. .. .. 2. *Q. Griffithii.*
  Mature leaves glabrous :—
    Acorn sub-globular; Leaves setaceous, serrate. .. .. 3. *Q. serrata.*

II. Male spikes as in I. Involucre forming a cupule, the bracts connate into concentric laminæ 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 .. 4. *Q. semiserrata.*
      Glans ovoid less than 1 in. long. .. 5. *Q. glauca.*
      Glans globose :—
    Leaves thinly chartaceous, entire or sub-repand towards the apex. .. 6. *Q. patkoiensis.*
    Glans hemispheric; apex more or less depressed :—
    Leaves, thinly coriaceous lanceolate, acuminate, glaucous beneath, sometimes entire. .. .. .. 7. *Q. lineata.*
  Glans turbinate, only half enclosed by the cupules :—
    Leaves ovate-lanceolate, blunt, tomentose beneath. .. .. 8. *Q. Helferiana.*

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 :— *Q. Thomsoni.*

Nuts depressed, grey, velvety. .. *10.*

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. Olla.*

1. Quercus semecarpifolia *Smith.* Vern. *Dieng-sheh-Dingiem,* Synt. *Dieng-sia-soh-dingim,* Khasi.

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).

2. Quercus Griffithii *Hk. f. & Th.* Vern. *Dieng-wah,* Khasi.

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 $\frac{3}{4}$ 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. ·75-1 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.; *Ramrota*, 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, hemispheric, ·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 lamellæ crenate or denticulate. *Glans* much exserted, ovoid, shining, apiculate.

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

Wood hard, but is very little used. Weight about 58 lbs. per c ft.

Flrs. 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).

7. Quercus lineata *Bl. Dieng-lingim*, Khasi.

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. *Capule* 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; lamellæ about 7. *Glans* hemispheric; base truncate, smooth.
KHASI HILLS & NAGA HILLS, (3-5,000 ft.).

Fr. 7-9.

Var. Lobbii.—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.

9. Quercus lamellosa *Smith.*

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.).

Flrs. 7. Young fr. 1-3. Ripe fr. 9-11.

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.

Flrs. Hot season. Ripe fruit 7.

11. Quercus lanceæfolia *Roxb.* Vern. *Sarong-jola*, Mech.: *Chakho-misri*, Garo; *Phong-rong-arong*, Mik.: *Dieng-sning-rit*, *Dieng-rit*, *Dieng-patlua*, Khasi; *Shakma*. Sylh.; *Peltekong*, Tipp.

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.

Flrs. Cold season. Ripe fruit following cold season.

Var. semicristata *King*. Vern. *Dieng-sning-dingngin*. Khasi. Cupules smaller, the ridges sharply denticulate.
KHASI HILLS (G. Mann).

12. Quercus Olla *Kurz*.

Bark dark coloured, smooth. *Fruit* spikes stout, about 4 in. long. *Cupules* distinct with 1 ir 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 unbranched 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 panicled. *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 panicled; 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. .. .. .. 1. *P. spicata.*

Glans sub-orbicular:—

Leaves ovate-lanceolate. .. 2. *P. polystachya.*

Leaves tomentose or pubescent beneath :—

Nut ovoid, conic, velvety. .. 3. *P lappacea.*

More than half of the mature nut enclosed by the cupule :—

Glans hemispheric :—

Cupules always connate. Leaves lanceolate. .. .. 4. *P. pachyphylla.*

Cupules crowded, connate or solitary :—

Leaves glabrous, caudate; nut glabrous. .. .. 5. *P. fenestrata.*

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.*

1. Pasania spicata (*Smith*) *Chatterjee* Com. Nov. Mss. (Syn. Quercus spicata Smith). Vern. *Dieng-sarang, Soh-rang-khlaw*, Synt.; *Dieng-sanam-dingim*, Khasi; *Jagtop*, Garo; *Temi-sakho*, Ass.; *Kading-sarang*, Mik.

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. 8-10.

The following more or less stable varieties are recorded from Assam.

1. Var. brevipetiolata *A.DC.* Vern. *Dieng-soh-sanam-dingem*, Khasi.

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 ·9 in.). *Glans* not conical.
KHASI HILLS.

3. Var. microcalyx *Blume.*

Leaves small. *Acorns* small (under ·5 in. in diameter). *Glans* with conical apex.
KHASI HILLS & GARO HILLS.

Flrs. 8. Fr. 12.

4. Var. Collettii *King.* Vern. *Dieng-long-krow*, Khasi.

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 ·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.

Female flowers 4-5. Male flowers 2-3. Ripe fruit 8.

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.

5. Pasania fenestrata *Roxb. Chattarjee* Comb. Nov. Mess. (Syn. Quercus fenestrata *Roxb*). Vern. *Ka-dieng-jing, Dieng-sai.* Khasi; *Dieng-sa-sei-saw.* Syn.

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; scales 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, GARO 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.

6. Pasania dealbata (*Hk. f. & Th.*) *Chatterjee* Comb. Nov. Mss. (Syn. Quercus dealbata Hk. f. & Th. Mss.) Vern. *Dieng-sai*, Khasi; *Soh-rang-khlaw*, Synt.

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 glan; 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).

7. Pasania xylocarpa (*Kurz.*) *Schottky.* (Syn. Quercus xylocarpa Kurz). Vern. *Amke-asing,* Abor.

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 1-1·75 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.

Pasania Milroyia *A. Das* com. Nov. (Syn. Quercus Milroyii Purkayasth Sp. Nov.) Vern. *Dabahingori,* Ass.; *Ta,* Abor.

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

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* monœcious, 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 ·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. *Glan* ovoid-ellipsoid, truncated at tip, crowned by the remains of the style, about 1·2 by ·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 glaucescent; 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 ·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—Piphema, (2,000 ft).

Pasania Listeri (*King*) *Schottky* (Syn. Quercus Listeri King). Vern. *Bakhu-Khorang*, Ass.; *Kotai*, Garo.

A large tree. *Bark* grey or darkish-grey, rough or warty, often with vertical lenticels, reddish-brown, fibrous, ·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 ·7-1·3 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 1·9 by 1·2 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. ..	2. *C. Hystrix.*
Branchlets, petioles and leaves glabrous or nearly so :—	
Leaves lanceolate, elliptic-lanceolate or oblanceolate up to 8·5 in. long.	3. *C. argentea.*
Leaves ovate-oblong, up to 12″ long (nut single).	4. *C. castanicarpa.*
Walls of involucre bearing spines in tufts but not completely concealed by them; spines in ridges :—	
Leaves glabrous, entire.	5. *C. armata.*
Leaves cinereous or ferrugenous, pubescent beneath, entire or serrate towards the apex.	6. *C. tribuloides.*

1. Castanopsis indica *A. D. C.* Vern. *Dieng-soh-ut, Dieng-ka-sut,* Khasi; *Sirang-asing,* Miri.; *Hinguri,* Ass.; *Amke-asing,* Abor; *Dhalne-katus,* Nep.; *Bandar-kakei,* Cach.; *Sareng,* Darrang; *Chakkum-chhokran, Chhakkhu-khokrak,* Garo; *Phongrong-arong,* Mik.; *Dieng-sarang,* Synt.; *Kara-changne,* Duff.

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.

2. Castanopsis Hystrix *A. DC.* Vern. *Sirang-asing*, Miri.; *Sarang-baphang*, Cach.; *Bon-Belphoi*, Cach.; *Thangji*, Manip.; *Sethem*, Kuki; *Kata-singra*, Sylh.; *Arkhala*, Nep.; *Chaukhu*, Garo; *Dieng-stap-dih*, Khasi; *Phong-rong-arong*, Mik.

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.

3. Castanopsis argentea *A. DC.* Vern. *Dieng-la-muskei*, Khasi.

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 ·4-·6 in. long. *Spikes* pubescent. *Female flowers* solitary. *Involucres* solitary and clustered, globose, tomentose; spines ·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 4-9·5, ovate-oblong of obovate-oblong, shortly acuminate, entire sub-coriaceius, shining and glabrous; lateral nerves about 10 on either half; reticulation minute; base acute; petiole stout, ·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 ·3 in. long). *Nut* single, ovoid.

MANIPUR & KHASI HILLS (?) No specimen in Forest Herbarium, Shillong.

Young fruit 8. Ripe fruit 12.

5. Castanopsis armata *Spach.* Vern. *Makhu-khorang-hingori, Horu-hingori,* Ass.; *Tang-asing,* Abor; *Kasning, Dieng-siar,* Khasi; *Choto-bangla,* Mech.

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 acutt or obtuse; petiole ·2-·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 elonyated 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).

6. Castanopsis tribuloides *A. DC.* Vern. *Chaukoma*, Jhar.; *Bol-phalak*, Garo; *Sarong*, Kach.; *Dieng-soh-ut, Dieng-sning-long*, Khasi; *Chongom, Shething*, Kuki; *Thing Basi*, Tipp.; *Phul-hingori*, Ass.; *Bakhalai*, Darrang; *Haraiching*, Naga.

A middle-sized, often large evergreen tree (80′/180″); young shoots more or less pubescent. *Bark* dark-grey, corky outside, ·5 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, densely covered with short branched often rufous spines. *Nuts* 2-3.
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; pesianth 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* monœcious. *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.*

1. Betula alnoides *Ham.* Vern. *Dieng-ling*, Khasi, Synt.; *Khengjau*, Kuki; *Bhojpotra*, Cach.; *Dieng-ling-arong*, Mik.; *Teria-ching*, Naga.

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 usual. ly fascicled. *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.

2. Betula cylindrostachys *Gauleb.* Vern. *Bol-gakkel, Bol-nangal*, Garo; *Dieng-ling*, Khasi.

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 ·5-1 in. long. *Male flowers* in dense catkins 3-6 in. long. *Fruiting spikes* panicled, 3-4 in. long. *Fruit* scale-like, ·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).

Flrs. & 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.*
Stamens 6-8 :—
Capsule densely woolly. .. .. *2. S. ichnostachya.*
Stamens 2 :—
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;

female densely flowered. *Stamens* 6-8. *Style* short, 2-fid. *Capsule* nearly sessile, globosely ovoid, densely woolly.

ASSAM (D. Chatterjee).

Flrs. Rainy season. Fr. 10-11.

3. Salix psilostigma *Anders.* Syn. Salix eriophylla Anders. Vern. *Dieng-jiamon-Roy*, Kh.

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 ·05-·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, diœcious, 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.

(I have followed Dr. Fr. Markgraf: Monographie der Gottung Gnemon in Bulletin Jard. Bot. Buitenzorg Sec. III, Vol. X, Levr. 4).

GNETUM Linn.

Mostly evergreen climbing shrubs, a few erect or small trees. *Leaves* decussate, entire, leathery. *Flowers* usually diœcious (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).

2. Gnetum montanum *MG. F.* Nom. Nov. (Gnetum scandens Roxb.) Vern. *Jeging-riubi*, Miri; *Mameilet*, Ass.; *Thanlping-rhui*, Lushai, Tipp.; *Mei-lar-iong-um*, Khasi; *Jermai-saprah*, Synt.

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* dicœcious, 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).

FAM. 133. TAXACEÆ.

Trees or shrubs. *Leaves* mostly narrow, linear or lanceolate. *Flowers* mostly dicœcious. *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* monœcious or dioecious. *Male flowers* solitary, fascicled or spicate, with imbricate bracts; antheriferou 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.*

1. Podocarpus neriifolia *D.Don.* Vern. *Kat-bhaluka*, Ass.; *Dieng-sia-Blei*, Khasi; *Jinari*, Cach.; *Thlang-phar*, Lush.; *Kherewal-tak;* Kuki. *Dieng-kse-um*, Synt.

A tall tree 40-60 ft. high, glabrous; branches whorled. *Bark* light cinnamon brown, peeling off in long papery flakes, ·16 in. thicn, 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.

2. Podocarpus latifolia *Wall.* Vern. *Thing-Raman,* Kuki.

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.

P. Wallichianus *C. Presl.* Vern. *Thing-romao,* Lush. Apparently quite a small tree. *Leaves* like bamboos, 4-5·5 by 1-2 in., acuminate.

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.

Taxus baccata *Linn.* Vern. *Soh-Blei, Dieng-Blei,* Khasi.

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 diœcious. *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.	1. *C. Mannii.*
Leaves with a broad rounded base, whitish beneath.	2. *C. Griffithii.*

1. Cephalotaxus Mannii *Hk. f.*

A small tree. *Bark* cinnamon-brown. *Leaves* 1-2·2 by ·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 & JAINTIA 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··15 in., more or less falcate, subacute, 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 monœcious. *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. ..	**2.**	**Picea.**
Needles flat. Cones upright, scales deciduous.	**3.**	**Abies.**
Long and short shoots both present :—		
Long shoots with scaly leaves, short shoots with green needles.	**4.**	**Pinus.**
Needles on both shoots. ..	**5.**	**Cedrus.**
Pollen grains not winged:—		
Needles flat. Cones pendulous, scales persistent.	**6.**	**Tsuga.**
(*iii*) Leaves spirally arranged; ovules erect; scales rudimentary or weakly developed:—		
Long shoots only present; carpels with toothed scale.	**7.**	**Cryptomeria.**
(*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.	**8.**	**Cupressus.**
Cone baccate or drupacious. Seeds not winged.	**9.**	**Juniperus.**

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 (·5 in. long), broadly ovate and overlapping, on older branchlets (·25 in. long). *Cones* 3-4 by 3·5-4·5 in.. *Seed* 1-1·2 by ·2-·3 in.

A native of NORFOLK ISLAND. Sometimes cultivated.

2. PICEA Link.

Picea Smithina *Boiss.* Syn. Picea Morinda Link. The Himalayan Spruce.

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 ·2 in. long; wing spathulate, ·5-·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* ·5-2 in. long, distichous, needle-like, flattened, all round the branchlets. *Flowers* monœcious. *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 th axils. *Ripe cones* cylindric, thicker and shorter than *A. Pindrow* (4-7 by 1·5-3); wing 1½ 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*

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. 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.*

1. Pinus Khasya *Royle.* Vern. *Dieng-se, Dieng-kysi*, Khasi; *Saral*, Beng.

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*

·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. *Devadaru*, 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 monœcious; 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, triangular; 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 Brunoiana *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 $\frac{2}{3}$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* ·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, ·5-·7 in. across; scales woody. *Seeds* compressed, ·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.

Flrs. 2-3. Fr. 10-11. "The cones take 2 years to mature." *Parker.*

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* ·3-·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 dicœcious. *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 gland on the back. *Flowers* monœcious. *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* diœcious 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.*

1. Cycas pectinata *Griff.* Vern. *Dieng-sia-goda.* Khasi; *Thaljimura.* Ass.

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

VERNACULAR, SANSKRIT AND ENGLISH NAMES

(*Ass.* means Assamese; *Beng.* Bengali; *Cach.* Cachar or Cachari; *Duff.* Duffla; *Kach.* Kacheri; *Kh.* Khasi; *Lush.* Lushai; *Manip.* Manipuri; *Mik.* Mikir; *Nep.* Nepali; *Sans.* Sanskrit; *Slyh.* or *Syl.* Sylhet; *Synt.* Synteng; *Tipp.* Tippera; *Eng.* English)

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