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FLORA OF ASSAM

BY

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VOL. III.

CAPRIFOLIACEÆ TO PLANTAGINACEÆ

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FOREWORD.

It is with much pleasure that Volume III of the Flora of Assam is published. This brings us to the end of Gamopetalæ. Steps will be taken to get Volume IV published from the beginning of the next Financial year.

The late Rai Bahadur U. N. Kanjilal made a comprehensive collection of materials for this Volume, but many Forest Officers and others have also made material contribution by sending specimens.

The draft has been revised and edited by Mr. A. Das, I.F.S., now retired, and I as Botanical Officer alone had to go through the proofs and make some additions and alterations. My Botanical Assistant, Babu Banka Bihari Syam, has been of great help to me in correcting the proofs and in other ways and I gladly acknowledge his services. The Volume has run up to over 500 pages, much beyond anticipation, but no pains have been spared to avoid mistakes.

Shillong,
The 15th February, 1939.

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

PREFACE

The third Volume of the " Flora of Assam " (Gamopetalæ) is now put before the public. The original manuscript of this Volume was completed by me, before my retirement in December 1934. (Ericaceæ—P. C. Kanjilal).

I had to take up this work again by the end of 1937, thoroughly revising and editing my original draft which extended over a period of more than 12 months and involved several references to Kew, Edinburgh, Sibpur and DehraDun and necessitated many personal visits to the herbarium of the Royal Botanic Garden, Calcutta, at my own cost, as in the prolonged period intervening between the original draft and the present publication, considerable changes in nomenclature have taken place, new species have been discovered and described and species have been newly recorded from the region of this " Flora ".

I have since described several species (previously not included) which have in certain cases been embodied in small type in this work or included in the addenda with short descriptions. In some instances the original Key to the species or even to the genus had to be revised and altered. Considerable alterations in nomenclature had to be resorted to in view of recent advancement.

It is not realised by critics that the compilation of the " Flora of Assam " could not be comprehensive as the orders of the Government of Assam on the subject were quite distinct. The original idea was therefore to prepare a " Forest Flora " for the region administered by the Forest Department and generally to exclude the herbs unless of great economic importance. I have tried to include on my own initiative whatever additional materials I have been able to obtain in India by personal visit to Sibpur herbarium or by correspondence with DehraDun, Kew and Edinburgh.

An attempt has however been made to bring this Volume, as far as practicable up-to-date, but in the absence of

facilities for ready reference, it is impossible to do justice to a work of this nature. Omission in including a few species of trees, shrubs and many herbs could not however be avoided.

It now remains to acknowledge thanks and indebtedness to all those 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 Gardens, Kew.

(3) Director, Royal Botanic Gardens, Kew.

(4) Superintendent, Royal Botanic Garden, Sibpur.

(5) Forest Botanist, Forest Research Institute, Dehra-Dun.

(6) Mr. M. V. Narayanswami, Royal Botanic Garden, Sibpur.

(7) Mr. D. Chatterjee, M.Sc., Royal Botanic Garden, Edinburgh.

I am personally indebted to Mr. R. N. De, B.Sc., I.F.S., for his hearty co-operation in all matters and to my friend Dr. K. P. Biswas, M.A., D.Sc., F.R.S.E., Superintendent, Royal Botanic Garden, Sibpur. for his ungrudging help in all possible directions and also to Babu Banka Bihari Syam, Botanical Assistant, Forest Botanist's Office, Shillong, who is associated with this work from its very inception.

In spite of repeated proof-reading it has not been practicable to avoid printer's mistakes.

A. DAS.

Shillong,
The 21st February, 1939.

INTRODUCTION.

In this Volume 36 families 345 genera and about 1,100 species and the following new species have been included (*vide* the Assam Forest Records Volume I, 1934, and Notes Royal Botanic Garden, Edinburgh. No. XCV, July 1938).

Agapetes Kanjilali *Das.*

Maba cacharensis *Das et. Kanjilal.*

Chirita mishmiensis *Debbarman ex Biswas.*

Strobilanthes furcatus *Biswas.*

Acrocephalus verbenæfolius *Watt Mss. descript. Mukherjee.*

Scutellaria assamica *Mukerjee.*

It has been exceedingly difficult for me to keep in touch with the modern nomenclature. Mr. Fischer of Royal Botanic Gardens, Kew, Dr. K. P. Biswas and Mr. Narayanswami of Royal Botanic Garden, Sibpur and Mr. D. Chatterjee, M.Sc., now working at the Royal Botanic Garden, Edinburgh, have rendered invaluable assistance in this connection. As far as practicable, the changes in modern nomenclature have been adopted. In some instances the modern name has been inserted after the old name as otherwise it would have necessitated the alteration of a large bulk of the manuscript and in consequence delayed this publication considerably.

It is my intention to disuss concisely the modern adoption in nomenclature in the following pages.

Cephalanthus occidentalis *Linn* has been introduced in this Volume as synonymous with C. naucleoides *DC* after Brandis, but there is a good deal of controversy on this. Craib (Flora Siamensis Ennumeration Volume II, 1932, p. 8) considers it rather unnatural to make the East Asiatic C. naucleoides *DC* synonymous with the North American C. occidentalis *Linn.*

The genus Wendlandia has been thoroughly revised by Dr. Cowan (Notes Royal Botanic Garden, Edinburgh, No. LXXX, October, 1932) it has not been quite practicable to

take advantage of this publication. I have generally followed Brandis and put a concise note on the additional species after Dr. Cowan.

A good deal of difference of opinion exists among botanists at present, about the synonymy of the genera Hedyotis and Oldenlandia. It is considered best to retain the name Oldenlandia following the views of a number of systematist. This change could not be made in time in the body of this Volume.

The generic name Mycetia *Reinw* (1826) has been retained for Adenosacme *Wall* (1832) for the sake of priority.

The genera Webera *Schreb*, Tarenna Gærtn and Chomelia *Linn*, are synonymous. There is a suggestion from Kew that the generic name Tarenna should be substituted for Webera.

Mr. D. Chatterjee, Edinburgh, suggests that the name Chomelia (*Linn*) should be retained from the point of view of priority.

(i) Chomelia *Linn* (1737) (non-Chomelia *Jacq* (1763).
(ii) Webera (*Schreb*) (1791)=Chomelia *Linn.*
(iii) Tarenna *Gærtn* (1788)=Chomelia *Linn.*

Gamble in Flora of Madras has changed to Chomelia and Craib has retained Tarenna in " Flora Siamensis."

It appears that the *new combinations* of the species of Webera recorded from Assam have not yet been made, the generic name Webera and the old specific names have therefore been retained in this Volume.

Crabiodendron *W. W. Smith* (Record of Botanical Survey of India, Vol. IV, 1911, p. 276). C. Mannii *Smith* and C. Henryi *Smith* were described in Notes Royal Botanic Garden, Edinburgh, 1912, pp. 158 & 159 from Jowai and Yunnan respectively on very imperfect materials. Dr. Bor's Naga Hills specimens (Nos. 6271 and 2828) has now definitely proved that they are the same plant and the name C. Henryi *Smith* should be retained.

Mr. Chatterjee, Royal Botanic Garden, Edinburgh, has made new combinations as given below for Sideroxylon which name however has been retained in this work.

Sideroxylon Hookeri *Clarke*=Planchonella Hookeri (*Clarke*)

S. grandifolium *Wall*=P. grandifolia (Wall) Chatterjee Comb. Nov. Mss.

S. assamicum *Clarke*=P. assamica (Clarke) Chatterjee Comb. Nov. Mss.

Parameria pedunculosa *Benth* should now be named P. glandulifera *Benth.* Mez in Pflanzenreich calls Embelia Nagushia *Don*, E. undulata as he identifies E. Nagushia *Don* with E. vestita *Roxb.* In this work Brandis has been followed.

A considerable discussion has been raised in Bot. Mag. (8976) and the name Wattakaka volubilis (*Linn*) *Stapf.* has been restored as a new combination by Stapf. for Dregea volubilis *Linn.*

Crawfordia (Gentianaceæ) has been included under *Gentiana* by Marquand. Limnantheum cristatum *Griseb* is now known as Nymphoides cristata (*Griseb*) *O. Ktze.*

The generic name *Trichospermun* Don has been introduced by Dr. O. Kuntze for Æschynanthus *Jack* (Revision of Gen. Plant. pt. II, p. 475). After necessary investigation the conclusion arrived at is that the name *Æschynanthus* Jack is very well established, valid and universally accepted and should therefore be retained.

[*Vide* (a) D. C., Monograph Phanerogam. V (1883). 18, (b) Hooker, F. B. I., Vol. IV. (1884) 377, (c) Ridley, Flora of Malay Peninsula, Vol. II (1923), 496 (d) Handel Mazete, Symbolæ sinicae, Vol. II (1936) 884, (e) Smith, Record Bot. Survey of India (1913) 404, (f) Anthony Notes, Royal Botanic Garden, Edin. (1934) 191, 192. (g) Fischer, Kew Bulletin (1934) 320, 321.]

The name *Haplophragma* P. Dop. has been introduced for the genus *Heterophragma* DC. as the correct name.

Dædalacanthus Anders has been changed to *Eranthemum* Linn. and *Eranthemum* Linn. of C. B. Clarke (F.B.I.) is now known as *Pseuderanthemum* Radlkf. Genus *Ebermaiera* Nees has been changed to *Staurogyne* Wall and Asystasia to Mackaya.

The following species has appeared in the body in their old nomenclature which could not be corrected in time.

Modern Name	Name used in this Volume
Premna corymbosa (Burm. f.) *Rottl. et Willd.*	Premna longifolia *Roxb.*
Clerodendron indicum (*Linn.*) *O. Ktze.*	C. Siphonanthus *Br.*
C. glandulosa *Colebr ex Wall*	C. Colebrookiana *Wall.*
Sphenodesma involucrata (*Presl.*) *Robinson.*	S. unguiculata Schau.

Numerous specific names have undergone changes also.

Herbs, which have been collected in this herbarium, have been generally described and included in this Volume.

Shillong,
The 22nd February, 1939.

A. Das.

FLORA OF ASSAM

GAMOPETALÆ.

FAM. 70. CAPRIFOLIACEÆ.

Shrubs or small trees erect or scandent, rarely herbs, often with broad pith. *Leaves* opposite, rarely alternate, simple, lobed or imparipinnate; stipules usually absent. *Flowers* hermaphrodite, actinomorphic or zygomorphic, in cymes or panicles. *Calyx-tube* adnate to the ovary; limb usually 5-fid, imbricate. *Corolla* epigynous, funnel-shaped, tubular or rotate; lobes usually 5, imbricate, sometimes bi-labiate. *Stamens* usually 5, epipetalous, alternating with the lobes; filaments filiform or subulate; anthers 2-celled, versatile, dehiscing longitudinally. *Ovary* inferior, 2-8 celled (rarely 1); style terminal, elongating; stigma usually capitate; ovules anatropous, 1-8, pendulous from the inner angle or axile. *Fruit* a drupe with 1-8 cartilaginous pyrene or a many seeded berry, rarely capsular or dry. *Seeds* with copious fleshy albumen; embryo minute.

I. Corolla actinomorphic :—
  Fruit 1 seeded :—
    Leaves pinnate. .. .. .. **1. Sambucus.**
    Leaves simple, usually toothed. .. **2. Viburnum.**
II. Corolla zygomorphic :—
  Fruit many seeded :—
    Stem solid. Ovary 2-3 celled. .. **3. Lonicera.**
    Stem hollow. Ovary 5-8 celled. .. **4. Leycesteria.**

1. SAMBUCUS Linn.

Sambucus javanica *Blume.* Vern. *Hoklati,* Ass.

A shrub or small tree with large *pith*. *Leaves* imparipinnate; stipules small. *Leaflets* 2-6 by 1·2 to 2 in., oblong, elliptic, oblanceolate, serrate, acuminate, puberulous;

petiole ·16-·5 in. long. *Flowers* white, small, in terminal bracteate puberulous or almost villous corymbs; pedicels jointed; bracteoles minute. *Calyx* 3-5 toothed. *Corolla* broadly campanulate, white or pinkish, 3-5 cleft. *Stamens* 5. *Ovary* 3-5 celled, with one pendulous ovule in each cell. *Drupe* globose, black, crowned by the calyx teeth; endocarp cartilaginous.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, KAMRUP, NAGA HILLS, MANIPUR and KHASI HILLS (up to 4,000 ft.).

Roots used medicinally. Leaves used as vegetable.

Flrs. 5-8. Fr. 9-12.

2. VIBURNUM Linn.

Shrubs or small trees. *Leaves* opposite when bruised, with generally disagreeable smell. *Stipules* inconspicuous or 0. *Flowers* pentamerous, in terminal or subterminal corymbose or panicled cymes (all fertile in Indian species). *Calyx tube* turbinate or cylindric; limb 5-fid, persistent. *Corolla* rotate, tubular or campanulate, 5 lobed. *Stamens* 5. *Ovary* 1-3 celled with solitary ovule in each cell; style short; stigma 3 lobed. *Fruit* a dry or fleshy drupe, usually 1 seeded. *Seeds* oblong, compressed or concave by the endocarp projecting into the cavity; albumen uniform or ruminate.

Inflorescence umbellate :—
  Drupe 1-celled. Seeds flat :—
    Leaves dentate, parallel nerved, softly hairy beneath. .. .. .. *1. V. corylifolium.*
    Leaves remotely toothed or serrate, lowest pair of nerves basal, stellately pubescent beneath (distinctly fœtid). .. *2. V. fœtidum.*
    Leaves crenate serrate; nerves arcuate, glabrous beneath. .. .. .. *3. V. Colebrookianum.*
Inflorescence pyramidal, thyrsiform :—
    Leaves entire, glabrous, with a glaucous bloom when bruised. .. .. *4. V. cylindricum.*
Inflorescence usually 3-fid cymes, arranged in terminal thyrsus. Seeds concave :—
  Flowers appearing with or after the leaves :—
    Albumen ruminate :—
      Drupe dry, hard, blue. .. .. *5. V. atro-cyaneum.*
    Albumen uniform :—
      Corolla rotate :—

Fruit succulent, spuriously 2-celled :—	
Lateral nerves subparallel, remote, glandular. Drupe brownish red. ..	6. *V. odoratissimum.*
Lateral nerves close, oblique. Drupe bright red.	7. *V. Simonsii.*
Corolla tubular :—	
Fruit succulent, spuriously 3-celled :—	
Leaves pubescent on the nerves beneath. Drupe red.	8. *V. erubescens.*
Inflorescence terminal corymb :—	
Flowers appearing before the leaves :—	
Leaves serrate, parallel nerved, with tufts of hairs at the axils of nerves, distinctly fœtid.	9. *V. fœtens.*

1. Viburnum corylifolium *Hk. f. & T.* Vern. *Soh-lang, Dieng-soh-lang-sou, So-lang-ksew, Khasi.*

A straggling shrub up to 12ft. *Branchlets* and inflorescence rufous-hirsute. *Leaves* 1·3-3·7 by ·9-2·7 in., ovate or elliptic, acute, dentate, membranous, underside densely clothed with soft hairs, subcordate or rounded; lateral nerves 5-8 on either half, subparallel; petiole .3-.5 in. *Flowers* ·2 in. across, sub-orbicular or sessile. *Calyx* stellate-hairy outside; segments obsure. *Corolla* white, rotate, hairy outside, glaucous within, 5 lobed; lobes sub-acute or orbicular. *Stamens* exserted; anthers dorsifixed. *Ovary* 1-celled; style narrowed from a broad base; stigma 3 lobed. *Drupe* globular, bright red, ·25 in. long. *Seed* flat, shallowly grooved; albumen uniform.

KHASI HILLS, 5-6000 ft.
Fruit edible.

Flrs. 3-5. Fruit. 7-9.

2. Viburnum fœtidum *Wall.* Vern. *Dieng-soh-lang, So-lang-ksew,* Khasi.

A shrub upto 10 ft. *Bark* greyish. *Branchlets,* petioles and inflorescence clothed with stellate hairs. *Leaves* 1·3 by ·5-1·5 in., rhomboidal or elliptic-lanceolate, mucronate, coriaceous, glabrescent above, pubescent on nerves beneath; lateral nerves 3-4 on either half, lowest pair basal; base cuneate; petiole ·2-·3 in. long. *Flowers* small in compound pedunculate umbels; bracts numerous. *Calyx tube* glabrous; teeth minute, triangular. *Corolla* short, white. *Drupe*

scarlet red, acid. *Seeds* dorsally 2-grooved, ventrally 3 grooved; albumen uniform.

KHASI HILLS upto 6,000 ft.

Flrs. 6-7. Fr. 10-11.

3. Viburnum Colebrookianum *Wall.* Vern. *Giuporang-asing,* Miri; *Kumbad-pyrleng-doh,* Khasi; *Jongmathi,* Kuki; *Sangrima-buphang,* Mech; *Mezenga.* Ass. *Pani-phuti,* (Kam.); *Bolmichek,* Garo.

A large shrub; branches horizontal and spreading; young parts stellate, pubescent. *Leaves* drooping, 3·5-7 by 1·5-3·3 in., elliptic-oblong, shortly acuminate, crenate-serrate, thinly chartaceous, almost glabrous; lateral nerves 8-9 on either half, arcuate, almost glabrous; petiole ·4-·9 in. long. *Flowers* white, in erect axillary compound pedunculate umbels. *Bracts* minute; bracteoles wanting. *Calyx-tubes* glabrous; teeth minute. *Corolla* short, rotate. *Drupe* orbicular. red. *Seed* obscurely grooved; albumen uniform.

Common throughout ASSAM ascending up to 5,000 ft (KHASI HILLS).
Pounded leaves are used to cure old sores.

Flrs. 2-4. Fr. 6.

4. Viburnum cylindricum *Ham.* **Syn. V. coriaceum** Bl. Vern. *Soh-ja-hynlan, Dieng-soh-ratlan, Dieng-soh-law,* Khasi; *Pithe-chor,* Nep.

A shrub or small tree. *Bark* greyish, fibrous; blaze whitish, turning dark-brown. *Leaves* 3·5-8·5 by 1·2-2·5 in., usually entire, oblong, lanceolate, long acuminate, coriaceous, glabrous with tufts of grey hairs at the axils of nerves; if the leaves are bruised they appear to be covered with glaucous bloom; lateral nerves 4-6 on either half, arcuate; base truncate or cuneate; petiole ·5-1·5 in. long. *Flowers* sweet-scented, bluish white, in peduncled umbellate cymes. *Calyx tube* glabrous or puberulous; limb inconspicuous. *Corolla* tubular; lobes short, erect, puberulous. *Anthers* purplish, versatile. *Drupe* ·2 in., black, succulent. *Seeds* dorsally 2 grooved; albumen uniform.

GOALPARA, K. & J. HILLS up to 5,000 ft.
An oil is extracted from the seeds in Nepal (Brandis).

Flrs. 7-8. Fr. 9-10.

5. Viburnum atro-cyaneum *C. B. Clarke.*

An evergreen shrub. *Leaves* 1·5-3 by ·8-1·5 in., elliptic-lanceolate or narrow oblong, acute, entire, glabrous, shining; lateral nerves 7-9 on either half, impressed above; midrib impressed above, prominent beneath; base acute or cuneate; petiole ·3-·8 in. *Drupe* ellipsoid, blue, hard, dry. *Seed* concave; albumen ruminate; the intruded testa with red resinous glands.

MANIPUR (Watt. 5978) 6-10,000 ft.; MISHMI HILLS.

Flrs. 4. Fr. 1.

6. Viburnum odoratissimum *Ker.* Vern. *Dieng-soh-lang-sniang,* Synt.

A shrub or a small tree. *Leaves* 3-4·5 by 1-1·5 in., elliptic, sub-entire or sparingly dentate, shortly acuminate, coriaceous; lateral nerves 5-7 on either side, remote and glandular; base cuneate; petiole ·5-·8 in. *Panicle* glabrous, appearing with or after the leaves. *Flowers* white or whitish yellow, fragrant. *Bracts* and bracteoles caducous, stellately hairy. *Calyx* wide with 5 short triangular teeth. *Corolla* campanulate, glabrous; lobes ·16 in., elliptic. *Drupe* ·25-·7 in. long, succulent, terete, oblong, dark-red or reddish brown, 1-seeded. *Seed* concave, transverse section half moon-shaped; albumen uniform.

Jowai and Mawsmai (K. & J. Hills).

Flrs. 6-7. Fr. 8-9.

7. Viburnum Simonsii *Hk. f. & T.* Vern. *Soh-lang-eit-ksew,* Khasi.

A shrub or a small tree up to 40 ft. high. *Bark* thin, greyish outside and brownish mottled inside. *Leaves* 2·5-5·5 by ·8-2·8 in., elliptic, distantly cuspidate, dentate, short-acuminate, coriaceous, glabrous; lateral nerves 5-8, oblique, closer than *V. odoratissimum,* with tufts of greyish hairs at

the axils of nerves beneath; base rhomboid or cuneate; petiole ·4-·8 in. long. *Inflorescence* stellate—pubescent. *Flowers* usually white, tinged with red, sweet scented. *Corolla* short, campanulate. *Drupe* bright red, ·25 in. long.

KHASI & JAINTIA HILLS (4-6,000 ft.).

Flrs. 2-6. Fr. 8-10.

8. Viburnum erubescens *Wall.*

A small deciduous tree; young parts pubescent. *Leaves* 2-5 by 1-2·3 in., ovate, elliptic or sometimes suborbicular, acute or acuminate, upper part serrate, subcoriaceous, glabrous above, pubescent on the nerves beneath; lateral nerves 4-6 on either half; base rounded; petiole ·4-·9 in. long. *Inflorescence* usually pendulous at the ends of short branches. *Flowers* white or pale pinkish. *Calyx* teeth ovate. *Corolla* tubular, ·3-·6 in. long. *Drupe* ·25-·4 in. long, red. *Seed* deeply grooved.

MANIPUR (Watt. No. 6560).

Flrs. 3-5. Fr. 8-10.

9. Viburnum fœtens *Dcne.*

A shrub; young shoots emitting a fœtid smell when bruised. *Leaves* 1·3-2 by ·5-9 in., elliptic, acute, cuneate, serrulate, membranous, glabrous, pubescent on the nerves beneath; lateral nerves 5-7 on either side, distantly parallel, with distinct tufts of hairs at the axils of the nerves; base acute; petiole ·2-·4 in. *Inflorescence* pubescent or tomentose. *Flowers* appearing before the leaves, white, pinkish or rosy in lax terminal corymbs. *Bracts* deciduous; bracteoles scarious. *Calyx* ·1 in. long; teeth minute, irregular. *Corolla* tubular; lobes spreading, ·5-·7 in. long. *Stamens* 2, inserted near the top of the corolla tube, 3 lower down. *Drupe* ellipsoid, red. *Seed* deeply concave; albumen uniform; endocarp T-shaped.

KHASI HILLS up to 6,000 ft.
The fruit is said to be edible.

Flrs. 7. Fr. 9.

3. LONICERA Linn.

Shrubs, erect, scandent or climbing. *Bark* usually peeling off in thin shreds or papery flakes. *Leaves* opposite, entire, rarely lobed, short petioled or sessile. *Flowers* pentamerous, usually in pairs in axillary or sub-terminal peduncles or sessile in leaf axils, often connate by their ovaries, subtended by a bract and 2 bracteoles, the latter distinct or connate or sometimes absent; stipules usually absent. *Calyx tube* ovoid; limb short, 5 toothed or almost truncate, deciduous or persistent. *Corolla* tubular or funnel-shaped, often gibbous at base, limb oblique or bilabiate, 5 toothed, the upper lip 4 toothed, the lower reflexed, entire. *Stamens* 5, inserted on the corolla tube, usually near the mouth; anthers usually exserted. *Ovary* 2-3 celled; style filiform; stigma capitate; ovules many in each cell in double rows. *Fruit* a fleshy berry, distinct or connate in pairs, few seeded; albumen fleshy.

Shrubs, climbing :—
  Corolla bilabiate :—
    Ovaries free :—
      Corolla glabrous :—
        Flowers 3-5 in. Leaves fleshy. .. 1. *L. Braceana.*
      Corolla hairy :—
        Flowers up to 2·5 in. Leaves coriaceous. 2. *L. macrantha.*
        Flowers up to 1 in. Leaves thinly membranous. .. .. .. 3. *L. ovata.*
Shrubs, erect :—
  Corolla gibbous :—
    Ovaries confluent :—
      Flowers nearly sessile, ·25 in. .. 4. *L. ligustrina.*

1. Lonicera Braceana *Hemsl.*

A straggling shrub or climbing. *Leaves* 4-6 by 1·5-2·5 in., oblong-lanceolate or elliptic lanceolate, pointedly acuminate, entire, coriaceous, flesh coloured, glabrous, shining above, pale beneath; lateral nerves 6-8 on either half, arched and anastomosing, tertiary nerves obscure; petiole ·6-1·4 in. long, channelled; stipules represented by a transverse membrane at the base of the petiole. *Flowers* free, in pairs on solitary in axillary peduncle, (apparently) reddish outside, yellow and orange inside, 3-5 in. long. *Calyx*

5-partite. *Corolla* glabrous outside, hairy within with short stiff hairs, bilabiate, upper lip short, lower lip 1-1·25 in. long. *Stamens* 5, equal; anthers versatile; filaments and style hairy with stiff hairs. *Style* longer than the stamens; stigma capitate. Ovaries free, sessile, supported by bracts similar to calyx. *Berry* 1 by ·7 in., crowned with calyx teeth.

KHASI HILLS—Umwai, Mawmloo (C. B. Clarke), Bishop's Falls, Jowai (Mann), up to 4,000 ft.

I have examined all the original sheets of G. Mann and C. B. Clarke and compared them with the Burma collection of L. Braceana *Hemsl.* I do not find any justification of calling the Khasi Hill plant L. magnifica *Brace* or L. Regia as proposed by C. B. Clarke. I consider all the Khasi Hill sheets are L. Braceana *Hemsl.*

Flrs. 4-7. Fr. 10-12.

2. Lonicera macrantha *DC.* Vern. *Mli-rong-khong, Jermei-ren,* Kh.

A climbing shrub; stem woody, wood cream coloured. *Bark* thin, rough, exfoliating. *Branchlets* and inflorescence densely clothed with long soft hairs. *Leaves* 1·3-4 by ·6-2 in., oblong or oblong-lanceolate, coriaceous, ciliate, more or less rugose above and villous beneath; lateral nerves 5-7 on either half, tertiary nerves reticulate; base cordate; petiole ·1-·2 in. long. *Flowers* pale white, turning pale yellow, 1·5-2·5 in. long, often arranged in dense terminal panicles; bracts linear; bracteoles small. *Calyx teeth* linear, with long soft hairs. *Corolla* glabrous outside, bilabiate. *Stamens* 5; anthers versatile. *Style* purplish, filiform; stigma capitate. *Ovaries* free. *Fruit* geminate, axillary.

KHASI HILLS up to 6,500 ft.

Flrs. 4-5. Fr. 8-9.

3. Lonicera ovata *Ham.*

A climbing shrub with cinnamon coloured smooth branches. *Leaves* 1-2 by ·6-1·2 in., ovate, acute or rounded at the apex, thinly membranous, glabrous; lateral nerves about 4 on either half; tertiary nerves very finely reticulate, almost obscure; base rounded or subcordate; petiole slender, ·2-·3 in. long. *Flowers* about 1 in. long, in pairs, sessile,

yellowish white, slightly scented on slender pubescent axillary peduncles, bracts ovate, lanceolate; bracteoles minute. *Calyx-tube* glabrous or ciliate. *Corolla* bilabiate; tube slender; lobes spreading, ·2-·4 in. long, glabrous outside, the upper lip cut barely to the half into 4 lobes, the lower linear, ·2 in. long. *Stamens* 5. *Ovaries* free; style hairy, filiform. *Fruit* a fleshy berry.

ASSAM (Brandis).

Flrs. 5-6.

4. Lonicera ligustrina *Wall.*

An erect shrub or small bushy undershrub; stem twisted. *Branchlets* pubescent. *Bark* light brown, papery. *Leaves* ·4-2 by ·2-·7 in., ovate to lanceolate, acute or acuminate, entire, nearly glabrous, shining above; lateral nerves inconspicuous, midrib hairy beneath; base nearly rounded; petiole ·05-·2 in. long. *Flowers* greenish or creamy-white, sessile; bracts linear; bracteoles enlarged in fruit. *Peduncle* very short. *Calyx* limb tubular with a reflexed ring below the lobes; margin irregular. *Corolla* shortly elongate and gibbous at base, 5 lobed; lobes with scattered bristles. *Style* 3-fid at the extremity. *Ovaries* confluent. *Fruit* of 2 connate carpels, ruby coloured, juicy, supported by boat-shaped membranous bracteoles.

KHASI HILLS up to 6,500 ft.

Flrs. 4-6. Fr. 9-10.

4. LEYCESTERIA Wall.

Shrubs; branches herbaceous; young branches often fistular. *Leaves* distichous, sometimes stipulate. *Flowers* pentamerous, more or less zygomorphic or actinomorphic. *Inflorescence* spicate or pseudo-verticellate. *Calyx-segments* persistent, often unequal. *Corolla* funnel-shaped. *Stamens* 5, inserted on the throat of the corolla. *Ovary* 5-8 celled; style usually slender; stigma capitate; ovules numerous. *Berry* many seeded. *Seeds* minute; testa crustaceous.

Corolla zygomorphic.	..	..	..	*1. L. formosa.*
Corolla actinomorphic.	..	..	..	*2. L. crocothyrsos.*

1. Leycesteria formosa *Wall.*

A bushy shrub or undershrub with grey stem and deep green fistular branches usually from near the base. *Leaves* opposite, 2-5 by 1-3 in., stipulate, ovate or ovate lanceolate, long acuminate, entire or irregularly undulate, membranous, shining, glabrous or scabrous above, puberulous and pale beneath; lateral nerves 4-6 on either half, arcuate; base truncate or rounded; petiole ·2-1 in. long, connate at the base. *Flowers* glandular-puberulous, more or less zygomorphic, 1 in. long, purplish, in bracteate whorls forming axillary or terminal drooping spikes; bracts leaf-like, sessile, greenish purple, generally connate at the base, ciliate; bracteoles variable, smaller. *Calyx* 5 lobed, unequal, persistent. *Corolla* funnel-shaped, irregularly 5 lobed. *Stamens* 5, inserted on the throat of the corolla, equalling the lobes. *Ovary* 5-celled; style slender; stigma capitate; ovules many, biseriate in each cell. *Berry* ·5 in. long, subglobose, dark purple, glandular hairy, tipped with calyx limb. *Seed* minute, many.

KHASI HILLS (7737). Rare.

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

2. Leycesteria crocothyrsos *Airy Shaw.*

A small lax shrub, young branches fistular, terete. *Leaves* 5 by 2 in., ovate or oblong, rarely ovate lanceolate, acuminate, subremotely dentate; teeth glandular-apiculate: stipules reniform or suborbicular. *Inflorescence* terminal, villous-pubescent. *Flowers* bright orange, sessile in pseudoverticellate receptacle, ovoid. *Calyx* shortly connate, shortly and sparsely pilose outside, glabrous inside. *Corolla* actinomorphic. *Stigma* large, capitate. *Ovary* 5 locular, many ovuled. *Fruit* not seen.

K. Ward (8150). Delei Valley, ASSAM. (Kew Bulletin No. 4,1932. p. 170-171).

FAM. 71. RUBIACEÆ.

Trees, shrubs or herbs, erect, prostrate or scandent, sometimes thorny. *Leaves* simple, opposite or whorled with inter or intrapetiolar stipules, free or adnate to the petiole or forming a sheath round the stem. *Inflorescence* various, typically cymose. *Flowers* usually hermaphrodite, rarely unisexual, usually regular, epigynous, 4-5 merous. *Calyx-tube* adnate to the ovary; limb various (4-5), (sometimes one sepal longer than the rest and coloured). *Corolla* (4-5) gamopetalous. *Æstivation* valvate, contorted or imbricate. *Stamens* usually as many as the lobes of the corolla, inserted on the tube or mouth, alternating with the corolla lobes; anthers 2 celled. *Disk* epigynous, usually annular or cushion-shaped. *Ovary* inferior, usually 2-10 celled (rarely 1-celled); style simple or cleft; stigma various, one or more in each cell. *Fruit* various. *Seeds* various, usually with fleshy or horny albumen; embryo straight or curved; cotyledons usually flat, sometimes semiterete; radicle superior or inferior.

(In many of the genera the wood fibres have bordered pits—*Brandis*).

I. Ovules numerous in each cell (rarely few) fruit 2-celled :—
  Flowers in dense globose heads. Corolla funnel-shaped; stigma simple :—
    Erect trees or shrubs :—
      Corolla lobes valvate; ovary free, fruit often capsular. .. .. **1. Mitragyna.**
      Corolla lobes imbricate :—
        Calyx-tube joined in a mass :—
          Ovary 2-celled; ovules numerous. .. .. **2. Sarcocephalus.**
          Ovary 2-celled; ovules 1 in. each cell. .. .. **3. Cephalanthus.**
        Calyx-tube free :—
          Seeds not winged. .. **4. Anthocephalus.**

Seeds winged :—
Stigma globose, ovoid. Heads of flowers large, few together (1 or 2). .. .. .. **5. Nauclea.**
Stigma clavate. Heads of flowers small, numerous. .. .. **6. Adina.**
Climbing shrubs. Peduncles hooked. **7. Uncaria.**

II. Ovules numerous; flowers not in dense globose heads. Capsule 2-celled; seeds winged :—
Corolla lobes valvate; bracts foliaceous, persistent :—
Style 2-fid, epiphytic shrubs. .. **8. Hymenopogon.**
Style entire, usually trees. .. **9. Hymenodictyon.**
Corolla lobes valvate; lobes fringed. **10. Cinchona.**
Corolla lobes imbricate; style 2-fid. **11. Luculia.**

III. Ovules numerous; flowers in trichotomous panicles. Capsule 2-celled; seeds angular (not winged) :—
Corolla lobes twisted in bud. .. **12. Wendlandia.**

IV. Ovules numerous; flowers not in dense globose heads. Capsule 2 or 4-celled or cocci 2-4 :—
Corolla lobes valvate :—
Leaves entire :—
Stamens 4 :—
No interposed teeth between calyx teeth. .. .. .. **13. Hedyotis.**
With broad intervening sinuses between the calyx teeth. .. **14. Anotis.**
Stamens 5 :—
Capsule small, subglobose. .. **15. Polyura.**
Capsule compressed, broadly didymous, obcordate. .. .. **16. Ophiorrhiza.**
Leaves dentate :—
Stamens 2. .. .. .. **17. Silvianthus.**

V. Ovules numerous. Fruit a berry or drupaceous. Seeds minute. Corolla valvate :—
Inflorescence terminal :—
Calyx with one lobe usually enlarged and coloured. .. **18. Mussænda.**
Inflorescence axillary :—
Calyx teeth 4-6, persistent; stamens 4-6. .. .. .. **19. Mycetia.**
Calyx teeth 5, persistent; stamens 5. .. .. .. **20. Myrioneuron.**

VI. Ovules few or numerous in each cell (except Webera). Fruit berry. Seeds large :—

Inflorescence terminal :—
Flowers 5 merous :—
Bisexual :—
Stigma fusiform. .. .. **21. Webera.**
Dicœcious :—
Style-arms 2. .. .. .. **22. Brachytome.**
Inflorscence axillary or supra-axillary :—
Stigma fusiform :—
Corolla lobes 5 or more; ovary 1-celled .. .. .. **23. Gardenia.**
Corolla lobes 5; ovary 2-celled. **24. Randia.**
Style bifid; ovules 2-10 in each cell. .. .. **25. Hyptianthera.**
Style bifid; ovules 2 or 3 in each cell. .. .. **26. Tricalysia.**

VII. Ovules solitary in each cell. Corolla lobes valvate. Stamens inserted on the mouth of the corolla .—
Fruit of 2 cocci.
Seeds compressed dorsally :—
Herbs; fruit very small. **27. Knoxia.**
Drupe with 2-many free or united pyrenes. Seeds various :—
Corolla lobes valvate :—
Ovary 2-celled; stigma large, usually lobed. .. .. **28. Canthium.**
Ovary 5-celled; stigma 4-5 lobed. .. .. .. **29. Vangueria.**

VIII. Ovules solitary in each cell. Corolla lobes twisted in the bud; radicle superior :—
Inflorescence terminal, panicled or corymbose :—
Leaves and bracts coriaceous; style less than twice the length of corolla tube. .. .. **30. Ixora.**
Leaves membranous, bracts membranous, lower sheathing; style twice the length of corolla tube. .. .. .. **31. Pavetta.**
Inflorescence axillary, fascicled or solitary. .. .. .. **32. Coffea.**

IX. Ovules solitary in each cell. Corolla lobes valvate; radicle inferior. Fruit capsular or of 2 cocci or pyrenes; leaves fœtid when bruised :—
Capsule 5 valved at the base; style-arms 5; erect shrubs. .. **33. Leptodermis.**

Pyrenes (2) flat, orbicular or elliptic; styles 2 capillary; twining shrub. .. .. .. **34. Pæderia.**

X. Ovules solitary. Corolla lobes valvate; radicle inferior; ovules amphitropous. Fruit drupaceous or baccate :—

Calyx tube cohering; limb truncate :—

Flower heads dense, many flowered. .. .. .. **35. Morinda.**

Calyx tube free :—

Calyx limb 4-5 fid. Corolla throat villous. Fruit a Drupe. .. **36. Damnacanthus.**

Calyx truncate. Corolla throat glabrous. Fruit a Berry. .. **37. Prismatomeris.**

XI. Ovules solitary. Corolla lobes valvate; radicle inferior; ovules basal erect. Fruit drupaceous or baccate :—

Flowers in terminal trichotomous cymes :—

Ovary 2-celled :—

Corolla tube short, straight. Calyx 4-5 toothed. .. .. **38. Psychotria.**

Corolla tube slender, curved. Calyx 5 toothed. .. .. **39. Chasalia.**

Corolla bell or funnel shaped; cymes often few flowered; calyx limb dilated, unequal, 4 toothed. **40. Saprosma.**

Flowers in axillary clusters or short cymes :—

Ovary 4-9 celled. Corolla bell or funnel-shaped. Calyx 3-6 toothed. **41. Lasianthus.**

XII. Ovules solitary in each cell. Corolla valvate; ovules amphitropous. Ovary usually 2-celled :—

Fruit of 2 separate cocci both or one dehiscing ventrally. .. **42. Borreria.**

XIII. Ovules solitary in each cell. Corolla lobes valvate in bud. Ovary 2 celled; ovules basal. Fruit indehiscent, coriaceous or fleshy. Seeds peltate. Leaves whorled, extipulate :—

Corolla 5 merous. .. .. **43. Rubia.**

Corolla 4 merous. .. .. **44. Galium.**

1. MITRAGYNA Korth.

Shrubs or trees. *Leaves* petiolate, usually with transverse parallel nerves; stipules large, caducous. *Flowers* pentamerous, yellowish, in globose axillary or terminal solitary or panicled pedunculate heads, each surrounded by foliaceous bracts; often they are petiolate and subpersistent. *Calyx tube* short, obconic, truncate or 5 toothed. *Corolla* funnel-shaped; tube long; throat glabrous or pilose; lobes 5, valvate. *Stamens* 5 on the throat of the corolla; filaments short, filiform; anthers oblong, apiculate. *Ovary* 2-celled; style filiform; stigma mitriform; ovules many, imbricate on pendulous placenta. *Fruit* a globose head of 2 dehiscent cocci. *Seeds* campanulate, suborbicular; testa winged: albumen fleshy; cotyledons flattened; radicle superior.

Corolla lobe glabrous without :—	
Calyx limb short but distinct. Flower heads single or in cymes of three :— Bracteoles hairy at apex. ..	1. *M. parvifolia.*
Calyx limb O. Flower heads in ample trichotomous cymes. Bracteoles glabrous.	2. *M. diversifolia.*

1. Mitragyna parvifolia *Korth.* (Stephegyne parvifolia Korth).

A large deciduous tree; trunk irregularly shaped, often buttressed. *Bark* light brownish or greenish-grey, smooth with shallow depressions left by exfoliation, light pinkish white inside, soon turning to deep brown, very fibrous. *Leaves* very variable in size and shape, elliptic-orbicular, oblong, ovate or obovate, bluntly acuminiate, coriaceous, glabrous above, thickly pubescent beneath; lateral nerves 6-8 pairs, oblique; base cuneate to subcordate; stipules keeled, obovate, membranous, covering the buds and falling in thin expansion. *Flowers* light white or yellow in globose pedunculate heads about 1 in. in diameter. *Heads* solitary, terminal or in cymes of 3; bracteoles spathulate, minute. *Calyx-tube* short, truncate or minutely 5 toothed. *Corolla* narrowly funnel-shaped or trumpet-shaped; lobes 5, valvate. *Stamens* 5, inserted on the throat of the corolla tube; anthers apiculate; filaments short. *Ovary* 2-celled; style filiform,

much exserted, mitriform; base hollow. *Capsules* in globose head of 100-150, dry, ·12 in. long, splitting into 2 dehiscent cocci. *Seeds* many, winged, minute.

Fulbari—GARO HILLS.

Wood light pinkish brown, close, fine grained, and generally harder than that of Adina cordifolia. Uses similar.

Flrs. 6-7. Fr. 12-2.

2. Mitragyna diversifolia *Haviland*. Modern name M. rotundifolia (*Roxb.*) *O. Ktze.* Vern. *Sealphusri*, Nep.: *Timi*, Ass.; *Itum-po-arong*, Mik.; *Bonstip*, *Bonsodeb-phang*, Kach.; *Tong-khop-nopang-thing*, Kuki; *Bonsodeb-phang*, Kach.; *Tong-khop-nopang-thing*, Kuki; *Bonchampa* or *Lawa*, Sylh.; *Thinglung*, Lushai: *Choibong*, *Mankhup-thing*, Tipp.; *Lotumpoh-arong*, Mik.

A deciduous middle-sized tree. *Leaves* 3-8 by 1-7 in., orbicular, broadly ovate or elliptic or shortly acuminate, glabrous or finely pubescent; lateral nerves 7-9 on either half, subparallel; base rounded, cordate or attenuate; petiole ·5-1·5 in. long; stipules obovate, ·5-·7 in. long. *Flower-heads* greenish white, often lateral in ample trichotomous cymes with or without foliaceous bracts which are petiolate and persistent; bracteoles glabrous, hirsute along the upper part of the margin. *Calyx* short; limb obscure, hirsute along the margin. *Corolla* ·2 in. *Cocci* ribbed. *Seeds* winged at both ends.

NOWGONG (Lumding, Lanka); N. CACHAR HILLS (Haflong); LUSHAI HILLS, CACHAR.

Flrs. 3-7. Fr. 8-2.

2. SARCOCEPHALUS Afzel.

Sarcocephalus cordatus *Miq.* Modern name Nauclea orientalis *L* (1762) Vern. *Thing-ka*, Kuki.

A middle-sized deciduous tree. *Bark* dark grey, somewhat rough outside, light dun yellow inside, somewhat soft. *Leaves* 5-12 by 4-8. (Hooker), suborbicular, broadly ovate or elliptic-ovate, obtuse, entire, thinly coriaceous, glabrous, puberulous beneath; lateral nerves 7-8 on either half, subparallel; base rounded, often cordate; petiole ·7-1 in. long; stipules ovate, oblong, blunt. *Heads* globose, somewhat

nodding, 1 in. across, solitary, terminally on axillary shoots and axillary at the end pair of leaves. *Flowers* small, yellowish, fragrant, sessile, ebracteolate, more or less free. *Peduncle* 1-1·5 in. long. *Calyx-segments* clavate, minutely hairy. *Corolla* quite glabrous, ·25 in. long; lobes imbricate, obtuse. *Stamens* inserted on the mouth of the corolla tube; anthers sessile, acute. *Ovary* 2-celled; style exserted; stigma fusiform; ovules numerous. *Fruit* ·6-1 in. across, a globose fleshy syncarpium, but hardly cohering. *Seeds* few, ovoid, compressed, minute, not winged; albumen fleshy; embryo rather large.

CACHAR (Bhuban Hill).
Believed to be anthelmintic.
Flrs. 6-7. Fr. 11-12

3. CEPHALANTHUS Linn.

Cephalanthus occidentalis *Linn.* Vern. *Thengmi-rokarong,* Mik.; *Panikadam,* Ass.; *Dingla-miksiai,* Synt.; *Kadamphuli,* Upper Assam.

An evergreen elegant shrub or small tree; all young parts more or less pubescent or tomentose. *Bark* grey, deeply furrowed, salmon brown and spongy inside, ·5-·7 in. thick, soft, turning deeper brown, almost gregarious in swampy localities. *Leaves* 3-5 by 1-2 in., opposite or in whorls of 3 or 4, elliptic, ovate, ovate-lanceolate, acuminate, entire or undulate, membranous, glabrescent above, more or less pubescent beneath; lateral nerves 10-12 on either half, subparallel; rounded or narrowed at the base; petiole ·2-·8 in. long; stipules acuminate, often gland tipped. *Flowers* white, fragrant, sessile on globose heads of ·5 in. in diameter on 1-2 in. long puberulous peduncles arranged in terminal trichotomous leafy panicles, or sometimes solitary in the axils of the uppermost leaves; bracteoles clavate. *Calyx* campanulate, woolly inside; segments usually 4-5, rounded. *Corolla* trumpet-shaped; lobes usually 4-5, imbricate, alternating with black gland dots at the sinus. *Stamens* 4, inserted on the mouth of the corolla; filaments short; anthers bicuspidate at the base usually. *Ovary* glabrous, 2-celled, not confluent; style filiform; stigma clavate; ovules solitary, pendulous.

Fruit compressed of numerous 1-seeded cocci. *Seeds* shortly winged at the apex, arillate; albumen horny.

NOWGONG, CACHAR, UPPER ASSAM, KHASI HILLS.

Flrs. 3-5 or throughout the year.

C. naucleoides DC Prodr. is also found in Assam.—R. N. De.

4. ANTHOCEPHALUS A. Rich.

Anthocephalus Cadamba *Miq.* Modern name A. indicus A. Rich. Vern. *Logchu-arong*, Mik.; *Banthalang*, Lushai; *Donlin, Kardam*, Tipp.; *Roghu*, Ass.; *Mi-bol*, Garo; *Kodom*, Sylhet, Cach.; *Gongdok, Maupa, Kalam-phang*, Kach.; *Naranpadum*, Kuki; *Nipang-lulangasing*, Miri; *Dieng-soh-lang-pathi*, Khasi.

A large handsome deciduous tree with very straight cylindric stems and horizontal branches, more or less whorled. *Leaves* 5-10 by 2-4 in., ovate, elliptic-oblong, coriaceous, shining or glabrous above, pubescent beneath, acuminate; lateral nerves 8-10; base cuneate or obtuse; petiole ·5-1·5 in.; stipules caducous, linear-lanceolate. *Flowers* pentamerous, small, orange coloured, united by the confluent calyx tube, in dense terminal solitary peduncled globose heads; bracts stipular; bracteoles wanting. *Calyx* segments 5, imbricate, oblanceolate, persistent. *Corolla* funnel-shaped; lobes 5, imbricate; throat glabrous. *Stamens* 5, inserted on the throat of corolla; filaments short; anthers ovate, sagittate, apiculate. *Ovary* 4 celled above, 2 celled below; style exserted; stigma white, narrowly clavate; ovules very many on bifid placentas. *Pseudocarp* large, fleshy, orange coloured, 2-2·5 in. across. *Seeds* minute, angular, not winged; albumen fleshy; embryo clavate.

Common throughout ASSAM.

Wood soft, white or reddish. Used for packing boxes, planks and manufacture of matches.

Flrs. 12-7. Fr. 5-10.

5. NAUCLEA Linn.

Trees or shrubs. *Leaves* petiolate or sessile; stipules large, caducous or sub-persistent. *Flowers* pentamerous, sessile, in solitary or crowded globose pedunculate heads. *Peduncles* terminal, often thickened near the apex; bracts often large,

caducous; bracteoles smooth, subulate. *Calyx* tube pruinose, not united with each other; segments 5, deciduous, linear, subulate, usually tipped with valvate processes. *Corolla* infundibuliform; lobes 5, short, imbricate; throat glabrous. *Stamens* 5, on the throat of the corolla; anthers oblong or linear, included. *Ovary* 2-celled; style long, thickened; stigma globose; ovules numerous, pendulous. *Fruit* ·7 in., of 2 dehiscent many seeded cocci (·2 in.), which are pubescent outside. *Seeds* flattened, winged; embryo clavate.

Calyx lobes purplish. Corolla glabrous. Leaves shortly petioled; base narrowed into the petiole.	1. *N. Griffithii.*
Calyx lobes not purplish. Corolla grey-pubescent. Leaves almost sessile from a cordate base.	2. *N. sessilifolia.*

1. Nauclea Griffithii *Haviland* (=Adina Griffithii Hook. f.) Vern. *Dieng-soh,* Khasi.

A large tree, buttressed, often with a few ærial roots. *Bark* greenish-grey, with vertical fissures at places and with faint horizontal wrinkles, covered with numerous dark brown warts; inside pale dun-brown to rosy pink, finely and somewhat mattedly fibrous. *Leaves* 4-7 by 1·5-4 in., elliptic-oblong, obovate or sub-orbicular, obtusely mucronate, thinly coriaceous, glabrous, minutely punctate beneath; lateral nerves 8-10 on either half, tertiary nerves finely reticulate; base narrowed into the petiole; petiole ·2-·6 in. long. *Peduncles* 1-3, terminal, flattened up to the bracts, club-shaped above, 1·5-3 in. long, speckled with lenticels. *Flower buds* usually purplish, pale, slightly scented; bracteoles club-shaped, rusty hairy. *Calyx* white, hairy, becoming bristly in fruit. *Corolla* glabrous; lobes imbricate with minute purple tips, ovate; stigma exserted, globose. *Capsule* flatly 4-gonous, ·3 in.

Barapani, Nongkhlaw (KHASI HILLS), MANIPUR (Watt No. 7295) ascending upto 4,000 ft.

Flrs. 9. Fr. 12-2.

2. Nauclea sessilifolia *Roxb.*

A large deciduous tree. *Leaves* 3-5 by 2-4 in., ovate or elliptic-oblong, obtuse, entire, coriaceous, glabrous, dark green

above, pale beneath; lateral nerves 7-9 on either half, rigid, arched, almost sessile from a cordate base. *Heads* terminal on robust mostly solitary peduncles, 2-3 in. long. *Flowers* shaggily silky. *Calyx-segments* 5, clavate, villous, acute. *Corolla* lobes adpressed, grey, pubescent or villous. *Stigma* clavate. *Capsule* ·3 in.

CACHAR. *

Flrs. 11-12. Fr. 3-4

Nauclea orientalis L. described under Sarcocephalus cordatus Miq.

6. ADINA Salisb.

Tall or small trees, deciduous or evergreen. *Leaves* petioled; stipules large, caducous on its development. *Flowers* pentamerous, small with numerous filiform bracteoles, densely crowded in solitary or panicled globose heads. *Calyx* tube angled; segments 5, distinct. *Corolla* funnel-shaped or tubular; lobes 5, valvate; throat glabrous. *Stamens* 5, on the mouth of the corolla; filaments short. *Ovary* 2-celled; style filiform; stigma clavate or capitate; ovules many. *Capsule* small of 2 cocci dehiscent from below, many seeded. *Seeds* oblong, winged; endosperm copious, fleshy.

Leaves cordate (orbicular or broadly ovate). Calyx segments linear, pubescent beneath, deciduous.	1. *A. cordifolia.*
Leaves lanceolate, elliptic-lanceolate or oblanceolate, glabrous and glossy (like mango leaves). Calyx segments oblong-obtuse, persistent.	2. *A. polycephala.*
Leaves oblong or elliptic, slightly puberulous beneath. Calyx limb entire (not distinctly lobed), persistent. .	3. *A. oligocephala.*

1. Adina cordifolia *Hk. f.* Vern. *Phinkona,* Jharua; *Tarakchapa* Ass.; (*Goalp.*); *Karan,* Nep.; *Komalbola,* Rava; *Sandang,* Garo; *Bagting-phang,* Kach.; *Ting-khop-thing,* Kuki; *Haldu,* Hind.; *Dieng-thing-pholo, Thing-pholo-arong,* Khasi; *Lanpatia,* Ass., (Kamrup).

A large deciduous tree with a spreading crown, trunk usually buttressed at the base. *Bark* light grey, ·75 in. thick, exfoliating in patches; blaze light red inside with white

streaks, wood yellow; young parts pubescent. *Leaves* 3-9 in. long, and broad, broadly ovate or orbicular-cordate, abruptly acuminate, coriaceous, glabrate above, pubescent beneath; lateral nerves 5-8 pairs, basal pair branching close to the midrib; petiole 1·2-4·5 in.; stipules ·5-1 in. long, elliptic-obovate, concealing the terminal bud. *Flowers* yellow in globose, pedunculate heads. *Calyx tube* 5, angled-pubescent outside; segments 5, valvate. *Stamens* 5, on the mouth of the corolla; filaments short. *Ovary* 2-celled; ovules many in each cell; style filiform, exserted; stigma clavate. *Fruit* of numerous capsules each separating into 2 dehiscent cocci. *Seeds* minute, many, winged; endosperm copious, fleshy.

Common throughout the Province with the exception of UPPER ASSAM.

Wood yellow when fresh cut, afterwards changing into reddish brown, compact, moderately hard; wt. 40-50 lbs. per c.ft. Heart wood and annual rings not distinct, seasons well, takes a good polish and is fairly durable. Suitable for turnery, manufacture of combs, furniture and agricultural implements.

Flrs. 4-7. Fr. 8-1.

2. Adina polycephala *Benth.* Vern. *Thing-khum*, Lush.; *Thukel*, Kuki.

A small tree, trunk obscurely fluted; young branches slender, striate. *Bark* grey or brownish rough, exfoliating in irregular flakes, ·25 in. thick; inside reddish, turning dark-brown, fibrous. *Leaves* 3·5-7 by ·9-2 in., lanceolate or elliptic, lanceolate or oblanceolate, entire, caudate, acuminate, coriaceous, glabrous, glossy green (like mango-leaves); lateral nerves 7-10 on either half, subparallel, arcuate, obscure towards the apex; petiole ·2-·5 in. long. *Heads* small, ·35 in. across, pedunculate, in trichotomously branched terminal, panicles, ramification slender; peduncles and pedicels glabrous or puberulous. *Calyx-tube* short, pubescent; segments oblong —obtuse, persistent. *Corolla* glabrous, tube ·1 in. long; lobes 4-5, ovate, persistent. *Style* exserted; stigma clavate. *Capsules* obovoid, crowned by the calyx limb. *Seeds* minute, very shortly winged.

K and J. HILLS, LUSHAI HILLS and CACHAR.

Flrs. 10-12. Fr. 3-4.

3. Adina oligocephala *Havi.* Vern. *Haludsapa,* Dimapur (Sibsagar).

A middle sized tree. *Leaves* 4·9·5 by 2·5-4·5 in., oblong or elliptic, bluntly acuminate, entire, thinly coriaceous, glabrescent above, slightly puberulous beneath; lateral nerves 4-5 on either half, prominent beneath, more or less parallel, arcuate; base acute, sometimes unequal; petiole ·4-1·6 in. long. *Flowers* in trichotomous, leafy panicled heads, which are about 1 in. diameter. *Calyx* limb entire (not distinctly lobed), persistent. *Corolla* funnel-shaped; lobes ovate. *Style* exserted; stigma, clavate. *Capsules* obovoid, slightly oblique; crowned by the calyx limb. *Seeds* minute.

NOWGONG, SIBSAGAR, KHASI HILLS.

Flrs. 1-2. Fr. 3-4.

7. UNCARIA Schreb.

Climbing shrubs with axillary tendrils (sterile peduncles) often changed into recurved hooks. *Branchlets* usually angular. *Leaves* petiolate; stipules entire or bifid. *Flowers* in globose axillary and terminal, solitary or panicled heads. *Peduncles* become woody ultimately on development; bracts in pairs; pedicels sometimes elongated in fruit. *Calyx-tube* fusiform, 5 fid or partite. *Corolla* long, funnel-shaped, throat glabrous; lobes usually valvate. *Stamens* 5, adnate to the throat of the corolla; filaments short; anthers with 2 basal bristly appendages. *Ovary* 2-celled; style slender; stigma generally capitate; ovules many. *Fruit* a head of elongated septicidally 2-valved many seeded capsules. *Seeds* small with testa winged at both ends; albumen fleshy.

Capsule pedicellate; bracteoles 0. Corolla tube hirsute. Calyx-segment linear.	1. *U. macrophylla.*
Capsule sessile; bracteoles filiform :—	
Calyx segments linear. Leaves hirsute; lateral nerves 9.	2. *U. pilosa.*
Calyx limb entire or segments very short :—	
Lateral nerves 7-8.	3. *U. homomalla.*
Lateral nerves 4-5 :—	
Leaves submembranous (not glaucous).	4. *U. lævigata.*
Leaves coriaceous, glaucous beneath. ..	5. *U. sessilifructus.*

1. Uncaria macrophylla *Wall.* Vern. *Barasilata,* Ass.; *Baira,* Kach.; *Apua-chuni-rikang,* Mik.

A large woody climber; stem ribbed. *Branchlets,* petioles and peduncles rusty pubescent. *Leaves* 4-6·5 by 2·5-4 in., entire, ovate, oblong, bluntly acuminate, glabrous, rusty-tomentose beneath; lateral nerves 6-8 on either side, veins reticulate, prominent beneath; base subcordate; petiole ·1-·3 in. long. *Flowers* (16-200 in each head) in slender pedunculate terminal as well as axillary heads. *Peduncles* bracteate near the top. *Calyx* segments linear, as long as tube. *Corolla* hirsute outside. *Capsule* about ·17 in. long, spindle-shaped. *Fruiting* pedicels as long or longer than the capsule. *Seeds* very minute.

SYLHET, SIBSAGAR, LAKHIMPUR, N. CACHAR HILLS,
Flrs 12-1 Fr. 1-2.

2. Uncaria pilosa *Roxb.* Vern. *Subekbek,* Mik.

A large, stout, straggling and climbing shrub. *Branchlets* pubescent, obscurely angled. *Bark* greyish white, warty, having minute rectangular fissures. *Leaves* 2-6 by 1-3 in., entire-ovate, elliptic, acuminate, sub-membranous, pilose or scaberulous above, pubescent beneath; lateral nerves 8-10 on either half; base subcordate or rounded; petiole ·1-·3 in. long; stipules recurved. *Flowers* light green to dun-yellow, scented, in axillary stout pedunculate heads. *Peduncles* gradually narrowed from a thick base, bracteate in the middle; tomentose. *Calyx* hirsute; segments linear pubescent, as long as tube. *Corolla* tube very slender, yellowish. *Capsules* clavate, almost sessile, tipped by the long calyx segments.

LAKHIMPUR, N. CACHAR, SIBSAGAR.
Flrs. 4-5. Fr. 7-9.

3. Uncaria homomalla *Miq.*

A climber; branches pubescent. *Leaves* 2-3 by 1-1·6 in., oblong, ovate, elliptic-lanceolate, acuminate, subcoriaceous, glabrous above, (puberulous on the nerves only), sparsely hirsute beneath; lateral nerves 7-8 on either half, subparallel, impressed above, prominent beneath; petiole ·3-·4 in. long, hirsute; stipules bilobed; segments subulate, hirsute. *Peduncles*

pubescent, axillary, solitary, tapering upwards from a stout base, bracteate above the middle; bracteoles filiform. *Heads* ·6 in. across. *Flowers* sessile. *Calyx* limb obscurely toothed; segments ovate. *Corolla* tube ·3 in. long, hirsute. *Receptacle* small, hirsute. *Capsule* not seen.

LUSHAI HILLS (Fort Lungleh., Gage No. 28).
Flrs. 3.

4. Uncaria lævigata *Wall.*

A large scandent shrub, branches 4-angled. *Leaves* 3·5-6 by 2-4 in., elliptic or ovate-lanceolate, bluntly acuminate, submembranous, glabrous, shining above; lateral nerves 4-6 on either half, slender, arched, tertiary nerves finely reticulate, almost invisible; base usually rounded; petiole ·2-·4 in. long, supported by a hooked axillary spine; stipules 2-fid. *Flowers* small, (about ·6 in. long), sessile in solitary pedunculate head (·2-·3 in. across in buds, 1·5 in. across when flowers are mature). *Calyx* obscurely toothed. *Corolla* filiform, glabrous. *Capsules* sessile, ·25-·5 in. long.

KHASI HILLS (Tharia, 45023—Clarke) 1,000 ft: MANIPUR (Watt 7294) 5,000 ft.
Flrs. 10. Fr. 4.

5. Uncaria sessilifructus *Roxb.* Vern. *Sarpi-chaithirikang*, Mik.; *Boira-dhuka*, *Boira*, Kach.; *Nupang-rakroi*, Kuki; *Boroki-ankora*, *Barakhialata*, Ass.; *Dahini-lahiri*, Nep.; *Dumilsibudu*, Garo; *Borhi-kata*, Ass. (Kam.).

An extensive climber; stem woody. *Branches* 4-angled; young shoots and leaves red with pubescent curved axillary hooks. *Leaves* 2-4·5 by 1-2·8 in., elliptic, bluntly acuminate, entire, thinly coriaceous, glabrous, shining above, pale beneath, somewhat glaucous; lateral nerves 3-5 on either side; tertiary nerves finely reticulate; base somewhat rounded; petiole ·2-·5 in. long. *Flowers* in 1-1·5 in. long in slender pedunculate axillary or terminal panicled heads, bracteate in the middle. *Calyx* segments very short, rounded. *Corolla* tube slender; lobes yellowish, glabrous and silky. *Capsules* sessile, turgid and pubescent.

Common throughout ASSAM.
Flrs. 10-11. Fr. 12-2.

8. HYMENOPOGON Wall.

Small epiphytic shrubs. *Leaves* deciduous; stipules large, persistent with fleshy axillary bristles. *Flowers* white, corymbose; bracts large, foliaceous, reticulated. *Calyx* 5-partite, persistent. *Corolla* salver-shaped; tube long; lobes 5. *Stamens* 5, included in the inflated summit of the tube. *Ovary* 2 celled; style filiform; stigmas 2, linear; ovules many. *Capsules* crowned with the calyx, opening at apex in valves, many seeded. *Seeds* long, tailed at both ends; embryo minute; albumen copious.

Leaves oblanceolate, elliptic or obovate-lanceolate; lateral nerves 12-20 on either half. Corolla 1·5-2 in.	1. *H. parasiticus.*
Leaves subfalcate, lanceolate; lateral nerves 28-35 on either half. Corolla ·7 in. ..	2. *H. assamicus.*

1. Hymenopogon parasiticus *Wall.*

A deciduous straggling (usually) epiphytic shrub. *Bark* smooth, pale brown, exfoliating in papery pieces. *Leaves* 3-10 by 1-4 in., crowded towards the ends of branches, obovate—oblanceolate or elliptic, lanceolate—acuminate, membranous, puberulous on both surfaces, green above, pale beneath; lateral nerves prominent beneath, 12-20 on either half; base attenuate; petiole ·2-·5 in. long. *Flowers* white, conspicuous, in corymbs; primary branches usually bearing long petioled, white leafy, reticulated bracts. *Calyx* puberulous; segments linear. *Corolla* white, 1·5-2 in. long; lobes spreading, usually hairy towards the margin. *Capsules* ·5-·7 in. long, sessile, torpedo-shaped, pubescent, crowned with the persistent, calyx segments, bluish white when ripe. *Seeds* conspicuously long, tailed at both ends.

KHASI HILLS—Mairang (on Quercus dealbata), Shillong Peak, Serrarim—4-6000 ft.

Flrs. 6-7. Fr. 8-10.

2. Hymenopogon assamicus *Hk. f.*

A small straggling shrub. *Leaves* 9-12 by 2-2·5 in., lanceolate, finely acuminate, subcordate, glabrous; lateral nerves 28-35 on either half, almost straight, subanastomosing near the margin to form an intramarginal vein, tertiary nerves

inconspicuous; base cuneate; petiole ·4-·8 in. long, margined; stipules ·6 by ·4 in., ovate—acuminate, membranous. *Flowers* ·6-·8 in. long, in much branched bracteate racemes, the whole forming a terminal panicle about a foot long. *Calyx* urn-shaped. *Corolla* slightly pubescent without. *Style* slightly exserted. *Floral* leaves narrow, lanceolate, 2·5-3 in., strongly reticulate. (Fruit not seen.)

(From G. Mann's original sheet in Calcutta Botanic Garden).

KHASI HILLS.

9. HYMENODICTYON Wall.

Trees or shrubs with bitter bark and soft wood. *Leaves* petioled, deciduous; stipules usually glandular—serrate, deciduous. *Flowers* usually pentamerous, in simple racemes or panicles, with a few large leafy reticulate persistent bracts; bracteoles deciduous. *Calyx* tube ovoid; segments deciduous. *Corolla* tube slender, expanding in a campanulate or funnel-shaped 5-lobed limb; lobes valvate. *Stamens* 5, inserted below the corolla throat; filaments short, attached to the back of broad connective; anthers linear. *Ovary* 2-celled; style filiform, exserted; stigma capitate; ovules many. *Capsule* loculicidally 2 valved. *Seeds* numerous, winged all round, bifid below; albumen fleshy; embryo minute.

Flowers pedicellate, in compound panicled racemes. Leaves pubescent.	*1. H. excelsum.*
Flowers nearly sessile, fasciculate, in drooping simple spikes. Leaves pubescent, along the nerves beneath when young, afterwards glabrous.	*2. H. flaccidum.*

1. Hymenodictyon excelsum *Wall.* Vern. *Kodom, Phurkundi, Bhurkhundi,* Ass.; *Inglongallokoho-arong, Lo-keho—arong,* Mik.; *Bon-homjeng,* Kach:; *Choi-bong-thing,* Kuki; *Kel-kodom,* Mech; *Ding-dolobong-sir,* Khasi; *Bodi-kiru-chongipa, Wakandi, Boldikam, Mebol,* Garo; *Baja-phuty,* (Kamrup); *Lati-korum,* Nep.; *Uthamban,* Manip.

A large deciduous tree. *Leaves* turning yellowish before falling. *Bark* brownish-grey, smooth on branches and poles, soft and corky on old stems; inside softly fibrous, light-dun with broad distant white streaks, 1 in. thick. *Leaves* 4-9 by 2·5-5 in., elliptic-ovate or obovate—oblong, acuminate,

membranous, pubescent; lateral nerves 7-10 on either half; base narrowed into the petiole or acute; petiole 1-3 in. long; stipules oblong, with a broad base, caducous, usually glandular —serrate. *Flowers* white, fragrant, ·2-·3 in. long, densely crowded on terminal branched panicles; bracteoles minute; pedicels slender. *Calyx* minute, pubescent; segments deciduous, acute. *Corolla* pubescent outside; tube more than 3 times the length of calyx lobes, slender; limb cup-shaped; lobes 5, valvate. *Stamens* 5, inserted below the throat of the corolla; filaments dilated upwards. *Ovary* 2-celled; ovules many; style slender, long-exserted; stigma capitate. *Capsules* ellipsoid, ·6-1 in. long, reddish-brown when ripe, on recurved pedicels, 2 valved, many seeded. *Seeds* many, lenticular, winged all round; wing deeply cleft at the base.

KAMRUP, NOWGONG, N. C. HILLS, SIBSAGAR and CACHAR. Leaves used as buffalo fodder.

Flrs. 7-8. Fr. Cold season.

2. Hymenodictyon flaccidum *Wall.* Vern. *Mei-syrkan,* Khasi.

In Mr. Gamble's opinion it is an epiphyte but according to Sir G. King Wallich's H. flaccidum was a tree; (found growing epiphytically on a huge Cinnamomum Tamala tree (5243) at Tura, Garo Hills and also growing on rocks at Nongkhlaw, Khasi and Jaintia Hills (6358); young shoots warty. *Leaves* 3-11 by 3-6·5 in., elliptic, obovate, acuminate, membranous, minutely pubescent beneath, especially along the nerves when young, afterwards glabrous; lateral nerves 7-9 on either half, sub-equidistant, slender, arched; petiole 2-6 in.; stipules membranous, broadly ovate, caducous. *Flowers* almost sessile, spicate, 5-9 in. long, each spike-like; raceme being supported by an elliptic or lanceolate bract, 3 by 1·4 in., stalk 2-3 in. long. *Calyx* narrowly cup-shaped. *Corolla* glabrous; tube short, less than twice the length of calyx lobes. *Style* exserted. *Capsules* reflexed, ·6 in., sparingly spotted. *Seeds* with membranous bifurcate wings, margins of which are lacerated.

GARO HILLS, (Tura Sanitorium,) KHASI & JAINTIA HILLS (Nongklaw).

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

10. CINCHONA Linn.

Evergreen shrubs or trees, bark bitter, coppices freely; stipules deciduous. *Flowers* pentamerous, scented in terminal panicles. *Calyx* pubescent outside, 5-toothed, persistent. *Corolla* tubular, pubescent outside; lobes valvate in bud; margin pilose. *Ovary* 2-celled; style filiform, bifid; papillose inside. *Capsule* 2-celled, 2-valved, with septicidal dehiscence from the base. *Seeds* many, peltate, winged; edges lacerated; albumen fleshy.

Pits in the axils of secondary nerves not present:—		
Flowers red in short corymbiform cymes. Corolla tube densely silky.	1.	*C. officinalis.*
Flowers pale, flesh-coloured in pyramidal panicle; cymes few fld. Corolla lobes only fringed with hairs.	2.	*C. Calisaya.*
Pits in the axils of secondary nerves not present :—		
Leaves glabrous. Flowers yellowish-white.	3.	*C. Ledgeriana.*
Leaves softly pubescent or tomentose. Flowers rose-coloured.	4.	*C. succirubra.*

Cinchona plantation was started in Khasi Hills at Nongkhlaw as early as 1867, also in Jirang.

This was stocked with *Cinchona succirubra* Pavon and *micrantha* Ruiz et Pavon from Bengal plantation. A supply of seeds of *C. officinalis* Linn. was received from the same source at a later date. The plantation remained in charge of Mr. Bierman for about 3½ years. As the Bengal plantations were promising it was not considered worth while to extend the Khasi Hills plantation.

There were in all 13 plots of plantations, in the areas quoted above, Jirang being the highest elevation.

Samples of barks of C. succirubra, C. officinalis and C. micrantha, from the different plantations were sent to Govt. Quinologist in Darjeeling and best results were obtained from C. succirubra, which also thrived well on these hills.

"The Cinchona trees of Jirang approached the natural term of their existence (18 years old) in comparison with the other two areas. They served the purpose for which they were planted *i. e.*, to ascertain if Cinchona will grow in the Khasi Hills, which they will."

The plantations have been abandoned. The following species are now being experimented on in the Khasi Hills (Umsaw), Garo Hills (Tura Peak) and Mikir Hills—C Ledgeriana, C. succirubra, and C. Ledgeriana × C. succirubra. The last two centres have since been closed.

1. Cinchona officinalis *Linn.*

Leaves 3-6 by 1·2·5 in., ovate-lanceolate, lanceolate or elliptic-lanceolate, acute or acuminate; glabrous above with

hairy pits at the axils of the nerves; lateral nerves 6-10 on either half; base attenuate or acute; petiole ·6-1·4 in. long. *Flowers* red in corymbiform cymes, terminal or axillary. *Corolla-tube* ·5-·7 in. long, densely silky. *Capsule* ovoid-oblong, about ·6 in. long.

Was cultivated in KHASI HILLS (Nongkhlaw).
Quinine contents of bark 1.75-10.6%.

2. Cinchona Calisaya *Weddell.*

Leaves 3-6 by 1·5-2 in., oblong-lanceolate, elliptic-lanceolate or obovate-lanceolate, obtuse or acute, coriaceous, glabrous; lateral nerves 6-9 on either half, slender, axillary, pits rather inconspicuous; base acute or cuneate; petiole ·4-·9 in. long. *Flowers* pale flesh coloured in cymes, arranged in terminal pyramidal panicles, sometimes also axillary. *Corolla* ·3-·6 in. long; lobes with a white fringe of hairs. *Capsule* ·3-·6 in. long, ovoid-oblong.

Was cultivated in Khasi Hills (Nongkhlaw).
Quinine contents of bark 4%.

3. Cinchona Ledgeriana *Moens.*

A small tree. *Leaves* 3-6 by 1-2 in., elliptic-oblong or elliptic-lanceolate, obtuse or acute, coriaceous, glabrous; lateral nerves 5-8 on either half (without axillary pits); petiole ·4-1 in. long. *Flowers* strongly scented, yellowish, in large terminal, few flowered cymes arranged in pyramidal panicles (often running down to the 2nd pair of leaves); pedicels ·16 in. long. *Corolla* ·3-·6 in. long; tube pentagonous; lobes fringed with long white hairs. *Capsule* ·3-·6 in. long, elongate, ovoid, crowned with the remains of the calyx.

Cultivated in K. & J. HILLS, GARO HILLS and Mikir Hills (SIBSAGAR).
Quinine contents of bark ·4-13%.

MIKIR HILLS—	Root	Stem	Branch
Quinine Alkaloids	4·4%	3·6%	3·34%

4. Cinchona succirubra *Pavon.*

A large tree. *Leaves* 4-10 by 2·5-6 in.. elliptic, suborbicular or broadly ovate, acute, coriaceous, softly tomentose

beneath; lateral nerves 6-10 on either half, prominent (without axillary pits); base cuneate or acute; petiole 1-1·5 in. long. *Flowers* rose-coloured, in cymes arranged in thyrsoid terminal or axillary panicles. *Corolla* ·5-·7 in. *Capsule* ellipsoid, oblong, elongated, 1-1·4 in. long.

Cultivated in KHASI HILLS, GARO HILLS & SIBSAGAR—Mikir Hills.

Bark contents:—
Quinine 0·82-1·37%
Cinchonidine 3·2-5·13%

A hybrid C. Ledgeriana × C. succirubra is also being tried now in the province.

11. LUCULIA Sweet.

Luculia Pinceana *Hook.* Vern. *Soh-khlih, Dieng-symphiakhli, Dieng-tew-khohir, Dieng-doh-khlee, Dieng-pansingiang-khlih, Snam-mau-synrang,* Khasi.

A tall erect shrub; stem ash-coloured, wood cream-coloured, old leaves scarlet or turning greenish red. *Leaves* 2-6 by ·8-2·5 in., entire, elliptic, acuminate, coriaceous, usually pubescent on the nerves beneath; lateral nerves 11-16, on either half, ascending, subparallel; base narrowed into the petiole (·25-·7 in. long). *Flowers* large, pinkish, fragrant, glabrous, pedicelled, in terminal or axillary, branched corymbose cymes. *Calyx-segments* spathulate, greenish; margin and base inside tipped reddish brown with a distinct midrib. *Corolla* hypocrateriform; tube about 1·75 in. long; lobes imbricate in bud with interposed tubercles at the sinuses, which appear like a corona, adnate to the corolla and only partly, free at the sinuses. *Stamens* 5; filaments filiform, subadnate to the corolla tube; anthers linear-oblong, adnate to the filament. *Ovary* 2-celled; style slender, shorter than the corolla tube; stigma 2, linear, recurved at the tips. *Capsule* ·5-1 in. long, obovoid, usually with ribbed valves. *Seeds* many, minute; testa wrinkled, winged at either ends.

Common specially towards the eastern part of KHASI HILLS, on limestone formation. Mishmi Hills.

Flrs. 9-11. Fr. 4, but persists long afterwards.

12. WENDLANDIA Bartl.

Shrubs or small trees. *Leaves* opposite or ternate; stipules often persistent, entire or 2-fid. *Flowers* small, rosy or white in dense axillary or terminal panicled cyme, 2-3 bracteolate. *Calyx* tube globose with 4-5 subequal pubescent lobes. *Corolla* hypocrateriform or funnel-shaped, 4-5 lobed, imbricate in bud. *Stamens* 4-5, between the corolla lobes adnate to the tube; anthers exserted, versatile. *Ovary* usually 2-celled, rarely 3-celled; ovules many on globose axile placentas; style filiform; stigma entire, bifid or two partite. *Capsule* small, globose, 2 valved, many seeded. *Seeds* minute, compressed, obscurely winged; embryo short, albumen fleshy.

Leaves opposite :—

Corolla tube short less than twice the length of lobes :—

Capsule ·1 in. long :—

Corolla lobes equalling tube or slightly longer. Leaves 4-9 in. long; lateral nerves up to 20. .. 1. *W. exserta.*

Corolla lobes shorter than the tube. Leaves 3-7 in. long; lateral nerves up to 12. .. .. .. 2. *W. puberula.*

Capsule ·06 in. long :—

Corolla lobes recurved a little shorter than the tube. Leaves 3-7; lateral nerves up to 10. .. 3. *W. Wallichii.*

Corolla tube twice the length of lobes or longer :— *

Calyx hairy :—

Corolla lobes shorter than the tube. Leaves glabrous above (mature), glabrate beneath. .. .. 4. *W. tinctoria.*

Corolla lobes half the length of the tube or less. Leaves scaberulous above and harshly pubescent beneath. .. .. .. 5. *W. paniculata.*

Calyx glabrous :—

Calyx teeth minute. .. 6. *W. glabrata.*

Calyx teeth nearly as long as the tube. .. .. .. 7. *W. coriacea.*

Calyx teeth longer than the tube. 8. *W. ligustrina.*

Leaves usually in whorl of 3 :—

Calyx glabrous, teeth as long as tube; stigma clavate; style far exserted. .. 9. *W. pendula.*

(I have followed Brandis. Dr. Cowan has recently dealt with the genus Wendlandia in details in the "Notes from the Royal Botanic Garden, Edinburgh, number LXXX, Vol. XVI, October, 1932").

1. Wendlandia exserta *DC.* Vern. *Kadam,* Ass.

A small evergreen tree with rough brown bark, cracking longitudinally, and exfoliating in long strips. *Branchlets,* leaves and inflorescence grey pubescent or hoary. *Leaves* 4-9 by 1-3·5 in., entire, ovate, lanceolate or narrow oblong, acuminate, coriaceous, glabrate or pubescent above, softly tomentose beneath; lateral nerves 12-20 on either half, subparallel; petiole ·5-1 in. long; stipules ovate, recurved. *Flowers* white, sessile, ·15 in. across, fragrant in pyramidal panicles of cymes up to 10 in. long. *Calyx* grey tomentose; segments subulate. *Corolla* funnel-shaped, broad, recurved; lobes reflexed. *Stamens* alternating with the lobes; filaments equalling the anthers, which are exserted. *Style* bifid. *Capsule* hoary, pubescent, ·1 in. long, crowned by the erect lanceolate hairy calyx-segments.

Jokai Reserve, LAKHIMPUR; Apha River, SYLHET, (Kanjilal).

Flrs. 4-5. Fr. rainy season.

2. Wendlandia puberula *DC.* Vern. *Karakholi, Kadam,* Ass.; *Papka-changne,* Duff.; *Snam-maie,* Khasi; *Rismini,* Mech; *Theng-merok,* Mik.; *Mau-thok-rai-phang,* Kach.

A small tree. *Bark* brown-grey, soft, corky, closely and somewhat spirally fissured; blaze copper brown changing very dark brown, fibrous; innovation puberulous. *Leaves* 3-7 by 1-3 in., elliptic or oblong, acute, acuminate, rather membranous, glabrous above, except along the nerves, with brown pubescence along the midrib and nerves beneath; lateral nerves 9-12 on either half; petiole ·3-·7 in. long; stipules ·3-·8 in. long, usually caudate acuminate, persistent. *Flowers* sessile, very small, bluish white. *Calyx* hairy; segments triangular. *Corolla* funnel-shaped; lobes shorter than the tube. *Filaments* as long as the anthers; anthers linear. *Style* bifid. *Capsule* about ·1 in. long, nearly glabrous.

NOWGONG, DARRANG, GOALPARA, SIBSAGAR, N. C. HILLS, KHASI HILLS—ascending up to 4,000 ft.

Flrs. 2-4. Fr. 5-7.

3. Wendlandia Wallichii *W. & A.* Vern. *Dieng-salakba-basow, Dieng-sha-mot,* Synt.; *Dieng-sai-moit, Dieng-jasau, Dieng-cha-kaba,* Khasi.

A shrub or a small tree often branched from near the ground (or rather growing in a clump). *Bark* cinnamon brown, corky, split lines vertical, about ·15-·25 in. apart, soft inside, light creamy-dun brown, astringent; young leaves reddish-brown, yellow when old. *Leaves* 3-7 by 1-2·5 in., opposite, sometimes ternate, glabrescent, almost coriaceous, entire, elliptic or elliptic-lanceolate; lateral nerves 8-10 on either side; prominent beneath, with a distinct midrib; base cuneate; petiole ·2-·8 in. long; stipules caducous, brown, ovate, acute. *Flowers* white, slightly scented; pedicels hairy; panicles pubescent. *Calyx* glabrous or obsoletely puberulous, lanceolate, teeth small, acute, broadly deltoid. *Corolla* white, tubular, tube about 3 times longer than the calyx; lobes ovate, spreading or slightly recurved. *Anthers* resting on the mouth of the corolla tube. *Fruit* globose, about ·06 in. diam.

N. E. F. TRACT, SIBSAGAR, LIKHIMPUR, and KHASI HILLS, ascending up to 6,000 ft.

Flrs. 9-11. Fr. 12-2.

4. Wendlandia tinctoria *DC.* Vern. *Thengmerok,* Mik.; *Gauni-kewta, Rangapatiogach,* Ass.; *Dieng-ja-kybu, Dieng-joba, Dieng-khon-suet,* Khasi; *Dieng-sha-mot, Dieng-sha-lak-ba-khlow, Dieng-ja-lakba,* Synt.; *Borganchi, Bolnabat,* Garo.

A shrub or small tree; branches straggling or spreading. *Bark* smooth, brown to ash-coloured; corky and fibrous. *Leaves* 3-8 by 1-3 in., very strongly nerved, oblong, oblong-lanceolate or obovate, acuminate, glabrous above when mature, glabrate beneath; lateral nerves 10-12 on either half; base narrowed into the petiole, ·2-·8 in.; stipules ovate, keeled, cuspidate. *Flowers* sessile, white in pubescent, pyramidal panicles; bracts subulate. *Calyx* teeth oblong-ovate, hairy, persistent in fruit. *Corolla* slender; lobes shorter than the tube. *Filaments* short. *Stigma* oblong. *Capsule*

rounded, about ·07 in. across, hairy, reddish-brown when ripe.

KAMRUP, SIBSAGAR, NOWGONG, N. C. HILLS, GARO HILLS and KHASI HILLS, ascending up to 3,000 ft.
The bark is used as a mortant in dyeing.

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

5. Wendlandia paniculata *DC.* Vern. *Dieng-sha-mot, Dieng-sa-lakba, Dieng-ja-lakba,* Synt.

A small tree with spreading crown. *Bark* dark brown, deeply and closely furrowed inside, very light, dun-brown, fibrous. *Leaves* rough, 2-6 by 1-3 in., entire, elliptic or oblanceolate, scaberulous above, harshly pubescent beneath, specially on the nerves; acute at both ends; lateral nerves 8-11 on either half; petiole ·3-·8 in. long; stipules recurved, broad, orbicular, oblong or reniform, coriaceous, pubescent. *Flowers* sessile, white or greenish-white, in large villous spreading panicles. *Calyx* hairy, supported by one or two linear bracts; teeth rounded, shorter than the tube. *Corolla* funnel-shaped; lobes half the length of tube or less.

K. & J. HILLS—ascending up to 5,000 ft
Flrs. Hot season. Fr. Cold season.

6. Wendlandia glabrata *DC.*

A small evergreen tree; young parts specially branches of inflorescence, minutely grey canescent, otherwise quite glabrous. *Leaves* 4-6 by 1·5-2·3 in., elliptic-lanceolate, subcoriaceous, finely acuminate, dark green and glabrous above, reddish-brown underneath; lateral nerves 6-8 on either half, arched, prominent beneath, sometimes with tufts of hair in the axils; petiole ·5-1 in., narrowly margined; stipules twice as broad as long, shortly cuspidate. *Flowers* yellowish, subsessile, about ·15 in. long, in terminal pyramidal, panicles 6-10 in. long. *Calyx* glabrous; teeth minute, triangular. *Corolla* tube cylindrical or trumpet-shaped; limb reflexed. *Capsules* globose, 2-valved, about ·06 in. across. *Seeds* minute.

NAGA HILLS, LUSHAI HILLS and MANIPUR—ascending up to 6,000 ft.

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

7. Wendlandia coriacea *DC.* Vern. *Kala tilka,* Nep.

An evergreen small tree or shrub. *Bark* brown. *Leaves* 3-6 by ·8-1·5 in., entire, lanceolate, acuminate, coriaceous, shining above; lateral nerves 9-12 on either half, slender; base narrowed into the petiole; petiole ·2-·6 in. long; stipules erect, pointed. *Flowers* sessile, in densely flowered pyramidal panicle. *Calyx* glabrous; teeth nearly as long as the tube. *Corolla* tube slender; lobes oblong; stigma short.

DARRANG (opposite Rajakata).

Flrs. 1.

8. Wendlandia ligustrina *Wall.* Vern. *Theng-merok,* Mik.; *Man-thok-rai-phang,* Kach.

A much branched small tree. *Bark* greenish, with vertical split, ·25 in. thick; inside white, turning brown, fibrous; old leaves red. *Leaves* 3-5 by 1·2-2 in., entire, obovate, lanceolate to elliptically lanceolate, acute, almost coriaceous, glabrous or puberulous on the nerves beneath; lateral nerves 7-8 on either half, sub-parallel; petiole ·2-·7 in. long; stipules adpressed, cuspidate. *Flowers* small, sessile, in lax pubescent panicle. *Calyx* glabrous; teeth filiform, longer than the tube. *Corolla* glabrous; lobes oblong, shorter than the tube. *Stamens* and styles exserted.

N. C. HILLS, KHASI HILLS.

Flrs. 1.

9. Wendlandia pendula *DC.*

An elegant somewhat straggling shrub, with slender pendulous branches; branchlets glabrous. *Leaves* usually in whorls of 3, almost sessile, (occasionally opposite) 3-4 by 1-2 in., ovate or ovate-lanceolate, obtusely acuminate, shining, pubescent on the nerves beneath; lateral nerves 6-7 on either half; base rounded or sub-acute; stipules small, triangular. *Flowers* clustered, in stout panicles 4-6·5 in. long. *Calyx* glabrous; teeth lanceolate, as long as the tube. *Corolla* tube ·16-·2 in. long; lobes oblong. *Stamens* shortly exserted. *Style* far exserted up to nearly twice as long as the corolla tube: stigma clavate.

MANIPUR. (Brandis).

Wendlandia grandis *Cowan.* W. tinctoria DC. Var. grandis Hk. f. Vern. *Bol-Borak*, Garo.

A tree 45′/35″; young branches brownish. *Leaves* 7·3 by 4·1 in., ovate or elliptic-ovate, abruptly short-acuminate, coriaceous; base cuneate; petiole glabrous, 1·4 in. long; stipules interpetiolar, triangular. *Flowers* fragrant, in fascicles, sessile. *Calyx* densely pubescent; segments obtuse—triangular. *Corolla* tube about ·2 in. long, pilose inside; lobe ovate. *Anthers* ovate; filaments short. *Style* bifid, somewhat exserted.

Throughout the Province upto 4,000 ft. Kanjilal's No. 5175.

Flrs. 1-3. Fr. 4-5.

Wendlandia scabra *Kurz.*

Journal Asiatic Soc. Bengal XII (1872), p. 310 For. Flor. British Burma II (1877), p. 73.

W. paniculata Hk. f. F. B. I. III, p. 38 proparte non. DC.

W paniculata Hook F. I. C. proparte vix. DC., Brandis Indian trees (1906), p. 374 proparte.

W. paniculata DC. sub sp. Cowan in Craib. Fl. Siam Enum. II pt. 1 (1932), 22.

SYLHET, CACHAR, MANIPUR upto 4,000 ft.

(*The Genus Wendlandia by Dr. J. M. Cowan, in notes R. B. G. Edin. No. LXVX, October, 1932.*)

Argostemma verticillatum *Wall.*

A small delicate herb. *Leaves* 3-4 by ·4-·8 in., in a whorl of 4. sessile, lanceolate, acuminate, glabrous, unequal-sided; base sometimes oblique. *Flowers* ·3 in. across, in umbels. *Corolla* valvate, ·15 in. across; tube ·4 in. long. *Calyx-teeth* acute. *Anthers* 5, free. apiculate, opening by pairs. *Capsule* 2-celled; seeds minute.

KHASI HILLS—Umsaw (Upto 4,000 ft.).

Flrs. 9. Fr. Cold season.

The following species of Argostemma (Leaves entire, membranous; stipules entire; corolla rotate; anther large; stigma capitellate; capsule 2-celled) occur in the region of the "Flora." They are small delicate herbs. It is not considered necessary to describe them in detail.

A. sarmentosum *Wall*, A. khasianum *C. B. Clarke*, A. pumilum *Benn.*, A. rostratum *Wall.* A. humile *Wall.* and A. fragile *Geddes.*

13. HEDYOTIS Linn.

Shrubs, undershrubs or herbs, sometimes climbing. *Leaves* usually opposite, occasionally ternate; stipules conspicuous, furnished with bristles, sometimes connate.

Flowers tetramerous, white or lilac, in axillary or terminal lax, or compact capitate cymes. *Calyx* turbinate or ovoid; segments 4, acute, persistent. *Corolla* campanulate or funnel-shaped; lobes valvate in bud. *Stamens* 4, inserted on the tube or throat; filaments short. *Ovary* 2-celled, style filiform; stigma bifid or 2 lobed; ovules numerous on sessile or stalked axile placentas. *Fruit* a small coriaceous or crustaceous septicidal or loculicidal capsule or sometimes of 2 separate or connate cocci or quite indehiscent. *Seeds* plano-convex or angled; albumen horny; embryo clavate.

Climbing shrub; flowers white in compact compound subcorymbose cymes.	1. *H. scandens.*
Erect stout under-shrub; flowers bluish in globose bracteate heads.	2. *H. uncinella.*

1. Hedyotis scandens *Roxb.* Vern. *Bhedeli lot*, Ass., *Bonhrathrin*, Lush.; *Samreting, Mikrisim*, Garo; *Jermiskie, Meidi*, Khasi; *Tyllie-iamu-sem*, Synt.

A slender woody climbing shrub with glabrous green branches; young twigs minutely puberulous, somewhat herbaceous, older twigs glabrous. *Leaves* opposite, 2·75-4·25 by ·65-1·5 in., narrow, oblong or elliptic lanceolate, gradually sometimes abruptly caudate, less often obtuse, acuminate, undulate, subcoriaceous, rather thick, glabrous and minutely punctate on both surfaces, paler beneath; lateral nerves somewhat obscure, about 5-6 on either half, arcuately ascending and meeting the upper pair; tertiaries fine, often sub-parallel; base narrowed to a margined and channelled petiole, lower portion of petiole adnate to a membranous intrapetiolar stipular sheath which has a horizontal ridge near the top; two prominent cusps about ·1 in. long, decurrent up to the ridge and is sometimes purple spotted, free end of sheath sparsely ciliate or erose. *Flowers* white, turning cream, ·2-·25 in. long, in axillary and terminal compact compound triochotomous subcorymbose puberulous cymes up to 1·5 in. long and about 2 in. across; peduncle ·6-·8 in. long; pedicels ·1-·15 in. long; bracts and bracteoles deciduous. *Calyx* tube dilated towards the apex; teeth 4, ·06 in. long, oblong, space between the teeth sometimes minutely setose. *Corolla* valvate in bud, 4 lobed;

tube short; throat slightly ventricose and hairy; lobes oblong, reflexed, lower portion shaggy within. *Stamens* 4, alternating with the corolla lobes, included except for the tips of anthers; filaments minute-villose; anthers 2-celled, introrse. *Ovary* 2-lobed, 2-celled, top free from the calyx-tube; style glabrous at the base, thicker and pubescent above, the two parts faintly articulated; stigma shortly 2-lobed, exserted; ovules in each cell numerous on a peltate placenta from the dissepiment. *Fruit* capsular, globose, about ·15 in. long, seated on the persistent calyx, apex extended between the calyx-teeth, dehiscing at the top and ultimately separating into 2 cocci; seeds minute, many, plenoconvex, with an irregular rim.

All over the province, ascending to 5,000 ft.

Used medicinally for eye diseases and after birth troubles. The roots are used with certain other medicines for sprains.

Flrs. mostly 10-1, according to locality and also at other times of the year. Fruits mostly cold season.

2. Hedyotis uncinella *Hk. & Arn.* Vern. *Sher-rit-arong*, Khasi.

An erect stout undershrub with perennial roots, stem glabrous, conspicuously 4-angled and ribbed, internodes long. *Leaves* ·8-3·5 by ·4-1·7 in., sessile, entire, ovate or ovate-lanceolate, acuminate, slightly pubescent above; nerves distinct, sub-basal; base acute or rounded; petiole 0··1 in. long; stipules small, glandular, sessile or stalked, pubescent. *Flowers* bluish in globose terminal or axillary bracteate heads. *Calyx* glabrous or ciliate; teeth recurved. *Corolla* tube short, glabrous; lobes linear. *Capsule* broadly ovoid.

KHASI HILLS, common.

Flrs. 7-9. Fr. Cold weather.

H. vestita *Br.*

A diffuse herb; branches terete; all parts villous. *Leaves* 2-3·5 in. long, lanceolate or narrow-lanceolate, acuminate; nerves prominent beneath, 5-7 on either half. *Cymes* small, axillary, shortly peduncled. *Capsule* minute.

CACHAR, KHASI and JAINTIA Hills, Aka hills (15128).

H. tenelliflora *Bl.*

A glabrous diffuse undershrub; branches quadrangular. *Leaves* sessile, 1-1·5 by ·15 in., linear-lanceolate, acuminate; margin revolute,

1-nerved; stipular cilia long. *Flowers* in few flowered clusters or solitary. *Calyx-teeth* rigid, ciliate. *Capsule* ovoid, glabrous.
KHASI HILLS, (upto 4,000 ft.).

Flrs. & Fr. Rainy season.

H. hispida *Retz.* modern name H. verticillata (L) *Lamk.*

A diffuse herb rather shrubby; branches scabrid *Leaves* margin recurved; base acute; stipular cilia long. *Flowers* in axillary clusters. *Calyx* teeth triangular. *Capsule* ovoid, hispid.
GOALPARA (Kachugaon), CACHAR, KHASI HILLS, UPPER ASSAM.

Flrs. & Fr. Cold season.

H. fulva *Hook. f.*, is also recorded from Khasi Hills

Oldenlandia nudicaulis *Roth.*
An erect annual, somewhat hairy. *Leaves* 1-1·5 by ·5-·7 in., ovate, membranous. *Flowers* in long-penduncled terminal lax cymes; branches capillary. *Calyx-teeth* minute and subulate. *Capsule* hemispheric.
KHASI HILLS (upto 5,000 ft.), UPPER ASSAM.

Fr. 10.

O. Heynii *Br.* **O. diffusa** *Roxb.* and **O. paniculata** *Linn.* also occur in the region of the "Flora."

14. ANOTIS DC.

Herbs, rarely undershrub, ascending or prostrate, rarely erect, sometimes with flaccid hairs; stipules scarious or bristly. *Flowers* small, in axillary and terminal cymes or heads. *Calyx tube* short; segments 4, erect or recurved, with usually broad sinuses. *Corolla* tubular or funnel-shaped; lobes 4, usually shorter than the tube, valvate. *Stamens* 4, adnate to mouth of corolla; anthers linear, oblong, included or exserted. *Ovary* 2- rarely 3-4 celled; style filiform; stigmas 2-4, linear; ovules usually few on placentas arising from near the base of the septum. *Capsule* didymous or laterally compressed, usually loculicidal (rarely indehiscent). *Seeds* peltate, boat-shaped or plano-convex; testa coarsely pitted; embryo clavate; albumen horny.

Perennials :—
Fruit turgid, dehiscing loculicidally :—
Leaves linear—lanceolate up to 4 in long. Calyx-teeth short. .. .. 1. *A. oxyphylla.*
Leaves ovate-lanceolate up to 2 in. long. Calyx-teeth large. .. .. 2. *A. ingrata.*

Fruit compressed, indehiscent :—

Leaves ·3-1 in. long, sessile or sub-sessile, ovate. .. .. .. 3. *A. Wightiana.*

1. Anotis oxyphylla *Wall.*

An erect small undershrub, sometimes gregarious; stem stout, often rooting at the lower nodes, glabrous. *Leaves* 1·5-4 by ·2-·5 in., entire, linear-lanceolate, acuminate; coriaceous; lateral nerves 3 on either half, obscure; base narrowed into the petiole; petiole ·1-·2 in. long; stipules linear-lanceolate, sometimes laciniate. *Flowers* white with a light shade of pale purple in much divided pedunculate terminal subcorymbose cymes. *Calyx* teeth short. *Corolla* much larger than the calyx-tube. *Capsules* pedicelled, hemispheric; cells 5-8 seeded.

KHASI HILLS up to 6,000 ft.

Flrs. 9-10. Fr. Cold season.

2. Anotis ingrata *Wall.*

A straggling fœtid undershrub or perennial herb with stout branches, 2-3 ft. high, hairy at the nodes. *Leaves* 1·5-2 by ·5-·6 in., ovate-lanceolate, obscurely crenate, acuminate, membranous, puberulous, specially on the nerves; lateral nerves 6-9 on either half, very slender; base cuneate; petiole ·1-·3 in. long; stipules bristly. *Flowers* white, shortly pedicelled, in terminal lax cymes. *Calyx-teeth* large. *Corolla-tube* ·16 in. long; lobes oblong. *Capsule* didymous. hemispheric; cells many seeded.

KHASI HILLS, ascending up to 6,000 ft.

Flrs. 8-9. Fr. Cold season.

3. Anotis Wightiana *Hk. f.*

A diffuse perennial herb. *Leaves* ·3-1 by ·2-·5 in., sessile or sub-sessile, ovate, entire, acute, pubescent; lateral nerves obscure; base rounded or acute. *Flowers* white, blue or purplish, shortly pedicelled, in small terminal 2-leaved involucrate capitate cymes arranged on short axillary branchlets. *Fruit* orbicular, compressed, 2-4 celled, indehiscent; cells 1-2 seeded; seeds rugose when dry.

KHASI HILLS.

Flrs. 9. Fr. Cold season.

Anotis gracilis *Hk. f.* and **A. urophylla** *Wall* are also recorded from KHASI HILLS. (F. B. I., pp. 71 and 72, vol. III).

Flrs. 8. Fr. later.

15. POLYURA Hk. f.

Polyura geminata *Hk. f.*

An undershrub (annual ?) with rooting stem. *Leaves* 1-5 by ·5-1·7 in., entire, opposite or whorled, elliptic to elliptic-lanceolate, obtuse or bluntly acuminate, membranous, glabrate above, pale beneath; lateral nerves 10-14 on either half, usually reddish-brown when dry, subparallel, arcuate; tertiary nerves zigzag; base narrowed into the petiole, which is often marginate (·2-·6 in. long); stipules filiform. *Flowers* pentamerous, white, crowded in long pedunculate axillary scorpioid cymes. *Calyx* lobes persistent. *Corolla* funnel-shaped; throat densely hairy; lobes valvate in bud. *Stamens* in the middle of the tube; filaments subulate; anthers bifid. *Ovary* 2-celled; style slender, puberulous; stigmas 2; ovules many. *Capsule* small, subglobose, many seeded, septicidal; embryo minute; albumen fleshy.

KHASI HILLS, ascending up to 4,000 ft.

Flrs 7-10. Fr. Cold season.

Spiradiclis bifida *Blume.*

A herbaceous plant, rather woody below, glabrous. *Leaves* 3-6 by 1-2 in., elliptic, elliptic-lanceolate or elliptic-ovate, acuminate. *Flowers* small, almost sessile along one side of the branches of a dichotomous terminal panicled cyme; panicels 4-8 in. long. *Calyx* segments 5. *Corolla* lobes 5. *Stamens* 5. *Ovary* 2-celled. *Stigma* lobed. *Capsule* small, sub-globose.

CACHAR, UPPER ASSAM, Aka Hills and KHASI and JAINTIA HILLS, up to 4,000 ft.

Flrs. 7-8. Fr. 8-9.

S. cylindrica *Wall.* KHASI HILLS, MISHMI HILLS.

16. OPHIORRHIZA Linn.

Ophiorrhiza ochroleuca *Hk. f.*

A small shrub, glabrous. *Leaves* 3-7 by 1·5-3 in., elliptic or elliptic-lanceolate, long acuminate, glabrous; lateral nerves 10-15 on either half; base narrowed into the petiole or acute; petiole ·5-·1 in. long; stipules 2-fid, lanceolate, caducous. *Flowers* secund on the branches of axillary or terminal dichotomous pubescent cymes; peduncles and branches stout; bracts 0 or obscure and caducous. *Calyx* teeth very short. *Corolla* tubular, cylindric, ·3-·5 in. long, 5-lobed; lobes short, recurved, pubescent within but not winged at the back. *Stamens* 5, inserted on the tube; anthers linear. *Disc* large, 2-lobed. *Ovary* 2-celled; style filiform; ovules many on basal ascending placenta. *Capsule* coriaceous, compressed, glabrous, pedicelled, ·3 in. across. *Seeds* many, minute, angled; embryo clavate; albumen fleshy.

CACHAR, SIBSAGAR, KHASI HILLS (ascending up to 4,000 ft.).

Flrs. 3-7. Fr. 8-9.

Ophiorrhiza Harrisiana *Heyne.*

A low soft herbaceous plant, pubescent or tomentose. *Leaves* elliptic or elliptic-lanceolate, acute or acuminate, pubescent on the nerves underneath *Flowers* pink in terminal cymes, usually tomentose; bracteoles short, deciduous. *Calyx-teeth* subulate. *Capsule* usually glabrous.

KHASI and JAINTIA HILLS, 5,000 ft.

Flrs. 5.

Ophiorrhiza hispida *Hook. f.*

A herbaceous plant, woody below, almost gregarious in Lakhimpur Dipterocarp forests; young plants hispid. *Leaves* 1-3 in., acuminate, puberulous; stipules large. *Flowers* in densely flowered terminal subglobose cymes; peduncles short, hispid; bracteoles linear, ciliate. *Corolla lobes* hispid. *Capsule* hispid.

KHASI and JAINTIA HILLS, 4,000 ft. LAKHIMPUR.

Flrs. 8.

Ophiorrhiza Mungos *Linn.*, O. rosea Hk. f., O. Wallichii Hk. f., O. oppositiflora Hk. f., O. Griffithii Hk. f., O. Treutleri Hk. f., O. fasciculata Don., O. hispida Hook f., O. subcapitata

Wall., O. calcarata Hook f., O. nutans C. B. Clarke, and O. pauciflora Hook. f. are also recorded from the region of the flora, specially from Khasi Hills.

(*F. B. I.* Volume III, Pp. 77-84).

17. SILVIANTHUS Hk. f.

Silvianthus bracteatus *Hk. f.*

A glabrous shrub: young parts often scabrid with short rusty hairs. *Leaves* 4-8 by 2-5 in., elliptic-obovate or lanceolate, irregularly toothed, sharply acuminate, membranous, glabrous; main lateral nerves 10-12 on either half, slender, much arched; petiole ·7-1·7 in., occasionally 3 in.; stipules membranous. *Flowers* ·5-·8 in. long, in axillary and terminal bracteate cymes. *Calyx* purplish green, accrescent; segments 5, rarely 4. *Corolla* white, funnel-shaped, tube hairy within; lobes 5, short, reflexed, induplicate, valvate, sinuses plaited. *Disc* large. *Stamens* 2, on the corolla-tube; filaments short; anthers linear-oblong. *Ovary* 2-celled; style long; stigma spindle-shaped. *Capsule* globose, up to ·3 in. across, crowned with the accrescent calyx. *Seeds* black, obliquely truncate at the upper extremity.

SYLHET; CACHAR; Nongpoh, Jowai (K. HILLS), Nichuguard, NAGA HILLS; MANIPUR.

Flrs. 4-5. Fr. 9-10.

18. MUSSÆNDA Linn

Shrub or undershrub, rarely herbs, erect or climbing, sometimes scandent, frequently very conspicuous by one of the calyx segments of some of the outer flowers developed into a large long petioled white or coloured leaf. *Leaves* opposite or ternately whorled; stipules free or connate, sometimes caducous. *Flowers* pentamerous, usually yellow, infrequently white or scarlet, in terminal cymes, rarely solitary. *Bracts* and bracteoles deciduous. *Calyx-tube* oblong or turbinate; segments usually deciduous. *Corolla* usually silky outside, tubular below, funnel-shaped above; throat villous; lobes valvate, with curled margins in bud. *Stamens* adnate to the throat or tube; filaments short; anthers linear. *Ovary* 2-celled; ovules many on peltate fleshy

placenta; style filiform; stigmas 2, linear. *Berry* fleshy, crown areolate. *Seeds* many, minute; testa pitted; embryo minute; albumen fleshy.

Calyx-teeth deciduous :—	
Berry globose, glabrous; lateral nerves 5-6 pairs.	1. *M. glabra.*
Berry usually obovoid with few scattered specks (not hairy) ; lateral nerves 6-8 pairs.	2. *M. frondosa.*
Berry globose, laxly hairy; lateral nerves 7-10 pairs.	3. *M. macrophylla.*
Calyx-teeth persistent :—	
Leaves glabrous. Berry white, succulent.	4. *M. keenani.*
Leaves villous. Berry areolate and with adpressed hairs.	5. *M. incana.*
Leaves strigose on the midrib beneath, sparsely setulose above. Berry areolate above with setaceous calyx segments. ..	6. *M. Roxburghii.*
Leaves tomentose when young, brownish pubescent on the nerves above. Berry black when dry ·3 in. long, very fine pubescent.	7. *M. Parryorum.*
Leaves pilose. Berry ·3-·4 in. long, green when dry, smooth.	8. *M. Pentasemia.*

1. Mussænda glabra *Vahl.* Vern. *Taksap-riube,* Miri; *Charbu-taru,* Duff.; *Khem-banju-doukha, Khimbandai, Longde-rikang, Syntew-jah-rong-tham,* Khasi; *Charai-atha, Chuba-atha, Sonarupa,* Ass.; *Wati-puon-phoi,* Kuki.

A large scandent often climbing shrub; bark brown, lenticellate. *Leaves* 2·5-3·5 by ·5-1·6 in., elliptic or oblong-lanceolate, acuminate, coriaceous, glabrous or puberulous on nerves, glossy green; lateral nerves 5-6 on either half; petiole ·2-·5 in. long. *Flowers* in rather dense terminal puberulous cymes. *Calyx* campanulate; teeth subulate, shorter than ovary, deciduous; petaloid segment 2·5 by 1·5-2 in., white, often tinged with green, strongly nerved, on stalk 1-1·5 in. long. *Corolla* pubescent, ·6-·8 in. long; lobes as long as broad. *Berry* ·5 in. long, globose, glabrous.

N. E. F. TRACT, LUSHAI HILLS, N. C. HILLS, SIBSAGAR, CACHAR, MANIPUR, KHASI HILLS, LAKHIMPUR, GOALPARA, ascending up to 4,000 ft.

Flrs. 3-5. Fr. 6-12.

2. Mussænda frondosa *Linn.*

A scandent shrub. *Leaves* 2-6·5 by ·8-2·8 in., entire, ovate, elliptic-oblong, acuminate, glabrate above, pubescent beneath; lateral nerves 6-8 on either half, tertiary nerves reticulate, often inconspicuous; base acute, often cuneate; petiole ·2-1 in. long; stipules ·2-·25 in., 2-fid. *Flowers* orange-coloured. *Inflorescence* dense and pubescent. *Calyx* deciduous; segments lanceolate twice the length of ovary or even longer. *Corolla* pubescent; tube about 1 in. long. *Berry* obovoid with few scattered specks (not hairy).

KHASI HILLS.

Flrs. 7-8. Fr. Cold season

3. Mussænda macrophylla *Wall.* Vern. *Dieng-salynthiah,* Synt.; *Dieng-tnow-tham,* (=Crab's claws), Khasi.

A large erect shrub with starggling branches, all parts more or less hirsute or villous; stem greyish. *Leaves* 2-6·5 by ·8-2·8 in., entire, elliptic or broadly elliptic, cuspidate, membranous; lateral nerves 7-10 on either half, sub-parallel, arcuate, impressed above, prominent beneath; base suddenly cuneate in the short petiole; petiole ·3-1 in. long; stipules broad, recurved. *Flowers* orange-coloured. *Calyx* segments ·5-·7 in., foliaceous, deciduous, nerves parallel. *Corolla* tube hirsute; lobes orbicular, apiculate; throat villous. *Berry* globose, about ·6 in. across, laxly hairy.

SIBSAGAR, KHASI HILLS, ascending up to 4,000 ft.

Flrs. 8-9. Fr. Cold season.

4. Mussænda Keenani *Hk. f.*

An erect robust undershrub, stem white with a thick coating of cork, which splits longitudinally. *Leaves* 4-9 by 2-5 in., entire, obovate or oblanceolate, abruptly acuminate, subcoriaceous, glabrous; lateral nerves 15-18 on either half, sub-parallel, very prominent underneath; secondary nerves more or less sub-parallel; base narrowed into the petiole or cuneate; petiole ·2-1 in. long, stout. *Flowers* in cymes, about 3 in. across, almost capitate. *Calyx* teeth ·5 in. long,

fine, persistent. *Corolla* nearly 1 in. long. *Berry* succulent, white.

Nongkhlaw-KHASI HILLS; CACHAR (Keenan).

Flrs. 9-10. Fr. Cold weather.

5. Mussænda incana *Wall.*

An erect undershrub, densely clothed with adpressed hairs. *Leaves* 2·6 by 1·2·8 in., subsessile, entire, elliptic, ovate or oblong, acuminate, subcoriaceous, villous; lateral nerves 10-12 on either half, sunk above; base rounded or acute; petiole ·05-·12 in. long. *Flowers* golden or chrome yellow, in subsessile corymbose cymes. *Calyx* teeth pubescent; enlarged calyx segments foliaceous, pubescent, cream or pale yellow, sub-basal nerved with elegant reticulate venation. *Corolla* ·75 in. long, slender. *Berry* with adpressed hairs and small areole.

Guma Reserve, GOALPARA.

Flrs. 5.

6. Mussænda Roxburghii *Hk. f.* Vern. *Dieng-ja-long-tham, Dieng-ja-lai,* Khasi; *Gardek,* Garo; *Bosolangde,* Mik.; *Naolungkamchal,* Lushai; *Chikribiphang,* Mech.; *Soklati,* Ass.; (?) *Imphat-champring,* Mik.

A large erect shrub; stem light brown. *Leaves* 2·5-8 by 1·3-3 in., elliptic to elliptic-lanceolate, entire, acuminate or caudate, membranous, sparsely setulose above, pale beneath, strigose on the midrib beneath and sparsely so between the nerves; lateral nerves 8-12 on either half; base narrowed; petiole stout, ·2-1 in. long; stipules lanceolate. *Flowers* orange, occasionally yellow, in dense corymbose cymes, about 2 in. across. *Calyx* teeth long, persistent, filiform or subulate; stalk of the petaloid calyx segment becomes more or less enlarged and white. *Corolla* tube pale green, very strigose, 1·25-1·5 in. long; lobes ·3 in., orange inside and pale white outside. *Berry* oblong to ellipsoid, crowded in a head-like mass, areolate above with setaceous calyx segments.

KHASI HILLS, LAKHIMPUR, GARO HILLS, SIBSAGAR, N. C. HILLS, LUSHAI HILLS, GOALPARA, DARRANG.

An infusion of the leaves is used for colouring carrying baskets and for binding the wicker work. Leaves are eaten by Mikirs and Khasis as vegetables.

Flrs. 6-11. Fr. Cold season.

Specimen No. 6102 appears to be a distinct variety. *Leaves* inflorescence and branchlets very hairy. (It is not uncommon--R. N. De)

Mussænda Treutleri *Stapf.*

A shrub, branches shortly pubescent. *Leaves* 6-12 by 3-6 in., ovate or elliptic-ovate, entire, acute, sparsely hairy, specially hirsute on the nerves on both sides; lateral nerves 6-8 on either half; base usually shortly cuneate; petiole ·6-1·5 in. long; stipules often 2-fid, ·3-·5 in. long, herbaceous. *Corymbs* many fld. dense, terminal, often with additional cymes on the upper axils; lower bracts broad, sometimes slightly laciniate; upper bracts calycine. *Calyx-teeth* linear or subulate, much and gradually narrowed, herbaceous, almost glabrous, ·3-·4 in. long, foliaceous; enlarged segment white. *Corolla* orange, ·7-1·25 in. long before opening, adpressed pubescent, almost glabrous on maturity, 5-cornered in bud; lobes ·25 in. long, tips cordate, throat hairy. *Berry* globose, dry, ·3 in. across, soon glabrescent.

KHASI HILLS (2,000-6,000 ft.). (Bot. Mag. Vol. V. 8,254)

7. Mussænda Parryorum *Fischer.*

A scandent shrub, branches terete. *Bark* brown or yellowish brown, pubescent at the nodes, more or less lenticellate, young parts tomentose (without lenticel). *Leaves* 3-6 by 2-3 in., elliptic, acuminate; young leaves tomentose, adpressed brownish pubescent on the nerves above in maturity; lateral nerves 7-9 on either half, prominent above, ultimate reticulation very minute; base gradually attenuate; petiole ·12-·6 in. long, adpressed brownish pubescent; stipules triangular, lanceolate, acuminate, often bifid at the apex, ·17-·2 in. long. *Flowers* in diffused sessile cyme, branches of which are finely greyish tomentose; bracts 2; bracteoles 3, linear, brown pubescent; pedicels short. *Calyx* ·12-·17 in. long, tube very short; teeth 5, very rarely 6, linear, brownish pubescent; enlarged foliaceous segment white, elliptic, acute or acuminate, up to 3·3 in. long, and ·17 in. broad, 7-nerved towards the base. *Corolla* 1 in. long; buds clavate; tube narrow cylindrical, inflated upwards, greenish grey, somewhat hairy outside, glabrous inside towards the base; lobes 5, patent, suborbicular or reniform, cuspidate, ·1 in. long. *Stamens* 5; filaments short;

anthers linear, ·2 in. long. *Ovary* turbinate, ·12-·17 in. long, hirsute; style filiform, dilated towards the apex; stigma 2, smooth. *Fruit* baccate, ·3 in. long, black when dry, very finely brown pubescent.

ASSAM, LUSHAI HILLS ascending up to 1,500 ft. (Kew bulletin 1928 No. 6, p. 274. Sheet no. 358 of Mrs. Parry).

8. Mussænda Pentasemia *Fischer.*

A handsome shrub 4-7 ft. high; branches terete brown, pilose; young branches angled, densely villous. *Leaves* 3-6 by 1·5-3 in., sub-equal, elliptic or broadly ovate, acute or acuminate, sub-undulate, finely pilose above, densely pilose below; lateral nerves 9-12 on either side, more or less prominent; secondary nerves transverse, reticulation very fine; base frequently attenuated and more or less decurrent, rarely round; petiole ·2-·8 in. long; stipules ovate, ·2-·4 in. long, sub-acute, often bifid towards the apex, densely brownish villous. *Cymes* terminal, bracteate, 1·2-2 in. long; rachis villous; bracts upto ·6 in. long, lanceolate, cordate or bifid. *Flowers* sub-sessile. *Calyx* obscure; segments 5; the enlarged segment white, elliptic-lanceolate, acuminate, attenuated towards the base, 1·5-2·5 in. by ·4-·6 in., elliptic-oblong or sub-orbicular, cuspidate (upto 4·8 in. long and 2·5 in. broad), setose on both sides. *Corolla* tube narrow-cylindrical, broadened at the top, densely yellowish pilose, ·8 in. long, brownish yellow; lobes 5, patent, round, ·2-·25 in. long, setose outside, glabrous inside. *Stamens* 5; anthers linear, included, flattened, sessile, ·2 in. long. *Ovary* narrow, ·17-·2 in. long, densely villous; style filiform; stigma clavate, bifid, smooth. *Fruit* oblong, baccate, ·3-·4 in. long, green when dry, smooth. *Seeds* minute, sub-orbicular, compressed; testa black, foveolate.

LUSHAI HILLS ascending 2,150 ft. (Kew bulletin 1928, No. VI, p. 275. Mrs. Parry, 275).

Acranthera tomentosa Br.

A hirsutely tomentose epiphyte. *Leaves* 4-10 in. long, elliptic or oblanceolate, acute, hirsute. *Flower* bluish in subterminal bracteate cymes. *Calyx* segments linear-lanceolate, ·6-1 in. long. *Corolla* villous; tube funnel-shaped. *Stamens* 5, included. *Ovary*

1-celled, fusiform; style filiform. *Berry* 1·5 in. long with persistent calyx-lobes.

KHASI HILLS; CACHAR (Keenan).

(*F.B.I.*, p. 92, Vol. III).

Polysolenia Wallichii *Hk. f.*

An erect glabrous undershrub. *Leaves* 3-5 in. long, lanceolate, acuminate, pubescent; nerves slender; base narrowed into a petiole, ·25-1 in. long; stipules ·3-·5 in. long. *Flowers* in solitary terminal peduncled heads. *Calyx-tube* short; segments 5, broadly ovate. *Corolla* pubescent, 1-1·25 in. long. *Ovary* 2-celled; style filiform; stigma short, dilated; ovules many, placenta peltate.

KHASI HILLS; CACHAR (Keenan)

(*F.B.I.*, p. 94, Vol. III).

19. MYCETIA Reinw.

Mycetia longifolia *O. ktze.* Syn. M. javanica Reinw= Adenosacme longifolia Wall.

An undershrub or small shrub; stem greyish-yellow; branches rigid, bristly. *Leaves* 3-10·5 by ·8-3·3 in., entire, margins sparsely ciliate, elliptic to obovate-lanceolate, acute, often caudate-acuminate, membranous, more or less pubescent, mainly on the underside; base narrowed into a slender petiole; petiole puberulous, ·2-1 in. long; stipules small, membranous, lanceolate, oblong, ·3-·5 in. long. *Flowers* yellowish, in compound trichotomous zigzagly branched subterminal cymes, dimorphic (*a*) short-styled; anthers inserted at the base of the corolla tube, (*b*) long-styled; anthers inserter on the mouth of the corolla tube. *Calyx-tube* hemispheric or sub-globose, not produced beyond the ovary; teeth 4-6, lanceolate, persistent, sinus glandular. *Corolla* tube campanulate, fleshy; lobes small, 4-6, valvate in bud with everted edges. *Stamens* 4-6; filaments short; anthers linear, oblong. *Ovary* 2-celled; style short; stigmas 2. *Berries* globose, broader than long, ·25 in. across, fleshy, spongy and snow-white, crowned with the membranous calyx-teeth. *Seeds* many, black, angled or minute, compressed, rugose; juice sweetish; embryo minute; albumen fleshy.

NAGA HILLS, LUSHAI HILLS, NOWGONG, KHASI HILLS, ascending up to 5,000 ft.

Flrs. 10-11. Fr. cold season.

20. MYRIONEURON Wall.

Myrioneuron nutans *Wall.*

A small shrub, sometimes climbing (Brandis); branches stout, old stem white with soft corky bark. *Leaves* 5-9 by 2·5-5 in., obovate-elliptic, acuminate, sub-coriaceous, glabrous above, subscabrid beneath, specially along the nerves; lateral nerves 15-20 on either half, arched and anastomosing at the extremity; tertiaries also strong, transverse to the secondary; quarternaries also conspicuous and form a fine pattern; stipules erect, oblong-lanceolate, about 1 in. by ·2 in. *Flowers* white (fading into dull yellow), in dense pedunculate bracteate corymbose cymes from the axils of the uppermost leaf. *Bracts* rigid, lanceolate. *Calyx* teeth subulate, exceeding the corolla, persistent. *Corolla* tubular; lobes short, erect, hispid, valvate in bud; throat villous. *Stamens* 5, adnate to the corolla-tube; filaments short, subulate; anthers linear, included. *Ovary* 2-celled; style short; stigma 2, linear-oblong, cohering. *Berries* white, about ·15 in. across, globose, crowned by the scarious calyx-teeth, many seeded. *Seeds* black, minute, angular; testa pitted; albumen fleshy.

N. E. FRONTIER TRACT, CACHAR, SYLHET, KHASI HILLS, GOALPARA, CENTRAL ASSAM.

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

Keenania modesta *Hook. f.*

A low sub-herbaceous herb. *Leaves* 6-12 by 1·5-3 in., opposite, elongate-lanceolate, abruptly acuminate, membranous, puberulous beneath; lateral nerves 15-20 on either half; base narrowed into the petiole ·75-1 in. long; stipules ·5-1 in. long. *Heads* globose, nodding, 1 in. across. *Calyx* ·3 in. long. *Corolla* tube inflated, glabrous, throat with a ring of stiff hairs. *Ovary* 2-celled; style short; stigmas 2, flat; ovules 8.

CACHAR (Keenan).
(*F.B.I.*, p. 101, Vol. III).

21. WEBERA Schreb. (Tarenna Gærtn.)

Trees or shrubs. *Leaves* usually drying black; stipules triangular-ovate, usually deciduous. *Flowers* bracteolate,

sessile or pedicellate, usually pentamerous, in terminal corymbose compound cymes. *Calyx-tube* ovoid or turbinate; limb 5-fid, rarely 4, produced beyond the ovary. *Corolla* funnel-shaped; throat glabrous or pubescent; lobes 5, rarely 4, contorted. *Stamens* 5, rarely 4 on the throat or mouth of the corolla; filaments short or 0; anthers slender, exserted. *Ovary* 2-celled; style stout, usually pubescent; stigma stout, fusiform, grooved, usually exserted; ovules usually numerous, rarely few or solitary, often immersed in the fleshy peltate placenta. *Berry* small, globose. *Seeds* plano-convex or cup-shaped; embryo small; albumen fleshy or horny; cotyledons foliaceous.

I. Ovules 2 or more in each cell :—		
Corolla glabrous without :—		
Berries ultimately black, leaves coriaceous.	1.	*W. corymbosa.*
Corolla hairy outside :—		
Corolla-tube shorter than the lobes. Leaves membranous :—		
Leaves black when dry. Berries many-seeded.	2.	*W odorata.*
Leaves olive-brown when dry. Berries 2-seeded	3.	*W. disperma*
Corolla-tube equalling the lobes :—		
Leaves rigidly coriaceous.	4.	*W. pumila.*
II. Ovules solitary in each cell :—		
Corolla throat villous; lateral nerves 8-10 on either half. Corolla funnel-shaped. ..	5.	*W. Kurzii.*
Corolla throat glabrous; lateral nerves 12-15 on either half. Corolla campanulate.	6.	*W. campaniflora.*

1. Webera corymbosa *Willd.* Tarenna asiatica O. ktze (modern name).

A large evergreen shrub or small tree. *Bark* greyish-brown with very thin cuticle, inside greenish white, leathery, ·12 in. thick; young shoots often covered with resinous excrescence. *Leaves* 3-6 by 1-2 in., elliptic or oblong, lanceolate, entire, coriaceous, apex acute or acuminate, glossy, shining above, often glaucous beneath; lateral nerves 6-10 on either half, abruptly turned upwards at the margin; base acute; petiole ·1-·5 in. long, stout; stipules

coriaceous, traingular from a broad base, subpersistent. *Flowers* white, fragrant, in terminal trichotomous compound sparsely hirsute cymes. *Calyx* ·12 in. long, sparsely pubescent; teeth triangular, ciliate. *Corolla* ·4 in. long in the bud; tube pubescent; lobes sub-acute, villous at the mouth, twisted to the left. *Berries* ultimately black, the size of a pea, crowned by the calyx which often becomes deciduous leaving a conspicuous scar. *Seeds* 6-10, shaped like orange segments; albumen horny; embryo cells pitted with oil.

N. C. HILLS (above Jatinga).

Flrs. 4-6. Fr. 8-1.

2. Webera odorata *Roxb.*=Tarenna odorata Robens (modern name) Vern. *Vokmit, Parmathim*, Lushai.

A shrub or small tree. *Bark* grey; blaze light pink. *Leaves* black when dry, 2·5-9 by 1-2·5 in., elliptic-lanceolate, entire, acuminate, membranous, glabrous; lateral nerves 6-9 on either half, ascending; base acute; petiole ·2-·6 in. long; stipules deciduous. *Flowers* pedicellate, in corymbiform pubescent cymes; bracts linear. *Calyx* minutely toothed. *Corolla* tube ·25 in. long, slender, shorter than the lobes. *Ovules* few, size of a pea (Roxb).

LUSHAI HILLS, MANIPUR (Clarke), KHASI HILLS, ascending up to 4,000 ft.

Flrs. 9-10. Fr. Cold season.

3. Webera disperma *Hk. f.*

A shrub or a small tree. *Leaves* 3·5·5 by ·8-2 in., olive-brown when dry, elliptic or lanceolate, entire, acuminate, membranous, glabrous; lateral nerves 10-11 on either half; base acute; petiole ·2-·6 in. long; stipules lanceolate. *Flowers* in shortly peduncled pubescent cymes. *Calyx* obtusely toothed. *Corolla* tube broad, pubescent, shorter than the lobes. *Ovary* with 2 ovules in each cell. *Berries* 2-seeded.

SIBSAGAR (Barpathar) Nambor Forests (Mann); KHASI HILLS (Mann)—ascending up to 4,000 ft.

Flrs. 2-5. Fr. Cold season.

4. Webera pumila *Hk. f.*

A dwarf bushy shrub with stout branches growing near edges of streams; stem greyish brown. *Leaves* sub-sessile, ·8-3 by ·15-·4 in., narrow spathulate or lanceolate, often oblique, entire, recurved apiculate, rigidly coriaceous; lateral nerves about 5 on either half, obscure; petiole very short; stipules tailed, pubescent. *Flowers* white, ·6-·8 in. long, in small subcapitate terminal hirsute cymes; buds club-shaped. *Calyx* teeth minute. *Corolla* tube and lobes about ·25 in. long. *Ovary* cells 3-5 ovuled. *Berries* size of a small pea, globose, ·2 in across. *Seeds* angled.

Gauhati (Kurz), N. C. HILLS (Dehingi bank), KHASI HILLS (Barpani River)—ascending up to 2,000 ft.

Flrs. 1-2. Fr. 9-10, or both throughout the year.

5. Webera Kurzii *Hk. f.*

A shrub or small evergreen tree. *Leaves* 5-8 by 1·5-2·5 in., elliptic or obovate-lanceolate, entire, acuminate, membranous, glabrous above, pubescent beneath; lateral nerves 8-10 on either half; base acute; petiole ·3-·5 in. long. *Flowers* white, ebracteate, pedicellate, in sessile or almost sessile trichotomous terminal cyme. *Calyx* teeth traingular, obtuse. *Corolla* glabrous outside; throat villous; lobes longer than the tube. *One ovule* in each cell of the ovary. *Seeds* deeply excavated centrally; testa coriaceous.

(Garampani) SIBSAGAR (U. Kanjilal).

Flrs. 4 (Burmah). Fr. Cold season.

6. Webera campaniflora *Hk. f.*

A shrub. *Leaves* 3-5·5 by 1-2·3 in., almost black when dry, elliptic or elliptic-lanceolate, entire, shortly acuminate, glabrous above, pubescent or puberulous beneath; lateral nerves 12-15 on either half; base acute, occasionally rounded or obtuse; petiole ·3-·7 in. long; stipules deciduous, cuspidate. *Flowers* pedicellate (Assam form), in terminal corymbose cymes; bracteoles 2 on each pedicel. *Calyx* hirsute; teeth larger than ovary. *Corolla* ·6 in. long with a short villous tube, spreading into a large campanulate limb; throat glabrous. *Anthers* long, sessile. *Style* short, hairy;

stigma long, fusiform; one ovule in each cell of the ovary. *Fruit* globose.

Phulertal (CACHAR).

Flrs. 8-9. Fr. Cold season.

Webera Schreb is now combined with the genus Tarenna Gærtn. *T. asiatica* O. ktze, and *T. odorata* Robins are modern names for *W. corymbosa* Willd and *W. odorata* Roxb. The combinations for the remaining species appear not to have been made so far.

22. BRACHYTOME Hook f.

Brachytome Wallichii *Hk. f.*

A shrub or small tree 20-25 ft. high; branches terete. *Leaves* 4-9 by 1-2 in., entire, oblong-ovate, lanceolate, caudate-acuminate, membranous, glabrous or hoary above, inconspicuously puberulous beneath; lateral nerves 7-12 on either half, slender; base acute; petiole ·2-·6 in. long; stipules triangular, persistent. *Flowers* rather small in polygamo-diœcious irregularly branched compound cymes from the axils of the uppermost leaves. *Calyx-tube* oblong; limb cup-shaped; teeth 5, persistent. *Corolla* funnel-shaped; lobes 5, short, twisted in bud. *Stamens* 5, inserted on the corolla throat; anthers subsessile, included. linear-oblong, imperfect in female flower. *Disk* in female flower small, in male flower cupular. *Ovary* 2-celled; style filiform; stigmas 2; ovules numerous. *Berries* small, ellipsoid, 2-celled, many seeded, crowned with the calyx limb. *Seeds* crowned, cuneate, compressed; testa thin, reticulate; albumen fleshy.

KHASI HILLS, 3-4,000 ft.

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

23. GARDENIA Linn.

Gardenia campanulata *Roxb.* Vern. *Gandaphaji,* Mech; *Darichik, Rukhawak,* Garo; *Bitmara, Dhubiu-khola,* Ass.; *Dieng-chhi, Dieng-soh-lah-kaskei, Soh-mai,* Khasi; *Biolem,* Sylh.; *Lam-lei-bi,* Manip.

A large shrub or a small tree armed with spinescent abortive branches. *Bark* greyish smooth, inside greenish grey.

Shoots puberulous. *Leaves* opposite or ternate, 1-4 by ·5-1·8 in., elliptic-ovate or oblanceolate, entire, bluntly acute or acuminate, coriaceous, glabrous; lateral nerves 5-6 on either half, inconspicuous; midrib slender; base narrowed into a short petiole; petiole ·2-·6 in. long; stipules interpetiolar, free, triangular, deciduous. *Flowers* dimorphic, *male flowers* (with sterile ovary) fascicled; bisexual flowers sessile, solitary; buds not resinous. *Calyx* of male flower 3 in., urn-shaped; mouth truncate, dilated; of bisexual flower-limb campanulate, segments contorted. *Corolla* campanulate; tube ·25-·3 in.; lobes short, obtuse. *Stamens* as many as corolla lobes; anthers included, sessile or nearly so. *Ovary* 1-celled; style stout; stigma green, deeply 5-lobed; placenta 2-6, parietal; ovules numerous. *Fruit* not beaked, ellipsoid or subglobose, obscurely 5 ridged with fleshy pericarp. *Seeds* numerous, compressed, embedded in the placenta; testa thin, albumen horny; embryo minute.

GOALPARA, GARO HILLS, KAMRUP, SIBSAGAR, LAKHIMPUR, N.E. F. TRACT, SYLHET, CACHAR, DARRANG and KHASI HILLS ascending up to 1,200 ft.

Leaves and fruits are eaten cooked. Boiled fruit is used for washing purposes.

Flrs 3-4. Fr. 10-11

Gardenia coronaria *Ham.*

A deciduous tree or large shrub; buds resinous. *Bark* greyish, splitting in small cylindrical piece enclosing the branchlets on drying. *Leaves* 3-7 by 1·5-3 in., entire, obscurely crenate towards the apex, obovate, acuminate, glabrous; base narrowed into a short petiole; stipules connate; lateral nerves quite conspicuous underneath, 11-13 on either half, arcuate at the margin. *Flowers* solitary, axillary. *Calyx-tube* upto 1·2 in., often split on one side upto the middle. *Corolla* white, fragrant; tube upto 3 in. long; lobes 5. *Fruit* ellipsoid, ribbed, about 1·2 by ·6 in.

SYLHET (13,927 and 13,928)

Flrs. & Fr. (Mature) 5.

R.I.D. No.

Gardenia turgida *Roxb.*

A small deciduous tree, armed with strong axillary often leaf bearing spines; bark smooth, bluish or pale grey. *Leaves* often crowded on dwarf shoots, 1-4 in. long, obovate, elliptic, obtuse or bluntly acuminate, coriaceous, tomentose beneath, sessile or narrowed into a short decurrent petiole; stipules distinct, caducous. *Flowers*

fragrant, polygamous, solitary or fascicled (upto ·4). *Calyx* subtruncate. *Corolla* white; tube ·3-·5 in. long, slightly dilated upwards; lobes oblong, longer than the tube. *Stamens* as many as corolla lobes; anthers sessile. *Ovary* 1-celled; ovules numerous on persistent placenta. *Fruit* globose, 1-3 in. across, mealy outside.

SYLHET (F. B. I. P. 118, Vol. III).
The fruit is said to be eaten cooked.

Flrs. 3-5. Fr. Cold season.

24. RANDIA Linn.

Small trees or shrubs, unarmed or spinous. *The* spines usually in opposite pairs axillary to the branchlets. *Leaves* often fascicled on arrested branchlets or opposite with one of the pair often arrested; stipules intrapetiolar, short, free or connate. *Flowers* often dimorphic, white or yellowish, large or small, solitary or fascicled or in axillary or leaf opposed cymes. *Calyx-tube* ovoid or turbinate; limb often tubular; segments 5. *Corolla* campanulate, funnel-shaped or salver-shaped; tube long or short, usually with a ring of hairs within; lobes usually 5, twisted to the left. *Stamens* 5; anthers sub-sessile. *Ovary* generally 2-celled; ovules usually numerous, sunk in fleshy placentas; style slender; stigma fusiform, entire or bifid. *Fruit* a globose, ovoid or ellipsoid, 2 celled, many seeded berry. *Seeds* angular, often embedded in pulp; albumen horny.

Armed :—

Leaves glabrous :—		
Fruit ·3 in. long, 4-seeded. A shrub.	1.	*R. tetrasperma.*
Fruit 1-2 in. long, many seeded, purple; spines decussate, short at the ends of arrested branchlets. A small tree.	2.	*R. uliginosa.*
Fruit ·3-·5 in. long; spines short, recurved. Leaves coriaceous. A rambling shrub.	3.	*R. longiflora.*
Fruit ·3 in. long; spines short, straight or wanting; leaves membranous. A shrub.	4.	*R. griffithii.*
Leaves pubescent or tomentose :—		
Flowers usually solitary; berries about 1·5 in. long, yellow when ripe. ..	5.	*R. dumetorum.*
Flowers in cymes or fascicles; berries small, ·25-·3 in. long, purple ..	6.	*R. fasciculata.*

Unarmed :—
Calyx-teeth minute. Corolla less than 1 in. :—
Flowers white. Corolla ·6-·8 in. across. Berry ·3 in. A middle sized tree. .. .. 7. *R. densiflora.*
Flowers yellow. Corolla ·5 in. long. A small tree or shrub. .. .. 8. *R. Wallichii.*

1. Randia tetrasperma *Roxb.*

A small erect rigid shrub with stiff branches and branchlets. *Bark* brown, fairly smooth, exfoliating in rather thick irregular scales. *Branches* subspinescent. *Leaves* variable, approximate at the ends of arrested branchlets, ·5-2 by ·15-·6 in., obovate to oblanceolate, glabrous, narrowed into a short petiole; stipules small, acute or acuminate. *Flowers* pentamerous, sessile, fragrant, greenish white, solitary. *Calyx-tube* turbinate; segment subulate with deltoid bases. *Corolla-tube* ·3 in. long; lobes oblong. *Anthers* exserted. *Stigma* fusiform. *Berry* globose, ·25-·35 in. across, purple, tipped with persistent clayx segments.

SYLHET (Hooker).
Flrs. 4-6. Fr Cold season

2. Randia uliginosa *DC.* Vern. *Bori-Bongana,* Ass.; *Agendra, Suskeng,* Garo; *Pirala,* Beng.; *Kendu,* Jharua; *Chehepi-arong, Chehepi,* Mik.; *Bonaphi-phang,* Kach.; *Thingpui,* Kuki.

A small rigid deciduous tree. *Bark* reddish-brown with horizontal cracks; branchlets quadrangular, pubescent when young; spines decussate at the ends of arrested branchlets. *Leaves* 2-8 by 1-3·5 in., often crowded at the ends of branchlets, obovate or obovate to oblong, shining above, often pubescent along the nerves beneath; lateral nerves 6-8 on either half; base cuneate; petiole ·3 in. long; stipules triangular. *Flowers* white, solitary, 1-2 in. across, dimorphic, peduncled and small or sub-sessile and large. *Calyx-tube* ·5-1 in. long; segments rounded. *Corolla* spreading; tube usually short; lobes 5-7, rounded. *Stamens* 5-7, sessile; the large (sub-sessile) form with a ring of hairs at the throat of the corolla tube and bi-lobed stigma, the

smaller form (functionally male) with a very short corolla tube glabrous within and undivided stigma. *Fruit* about 2 in. across and crowned with the persistent calyx segments, 2 celled.

NOWGONG, DARRANG, GARO HILLS, N. C. HILLS, GOALPARA.

The fruit is eaten and the leaves are browsed by deer and cattle.

Flrs. 5-6. Fr. Cold season.

3. Randia longiflora *Lamk.* Vern. *Pulikaint, Borokiamkora,* Ass.; *Subekbekarikang, Popung-rikang, Yang-tarlong,* Mik.; *Rhuibaikoy,* Lushai; *Bechuk,* Tipp.; *Silanasugur,* Mech; *Jermei-siatiew-krot, Mei-sia,* Khasi; *Bairauathi-doukha,* Kach.; *Yengokjaching,* Garo.

A large rambling and climbing glabrous shrub. *Bark* grey, smooth, light red with brown streaks inside; thorns recurved. *Leaves* 2-8 by ·8-4 in., ovate-elliptic or oblong, entire, abruptly acute, coriaceous, glabrous; lateral nerves 5-6 on either half, occasionally glandular at the nerve-axils; base cuneate; petiole ·2-·8 in. long; stipules triangular with a broad base. *Flowers* puberulous, white, fragrant, in axillary or leaf opposed shortly peduncled trichotomous cymes (often from alternate axils of reduced leaves). *Calyx* tube dilated; segments trangular. *Corolla* tube much longer than the lobes. *Stigma* bifid. *Berry* obscurely ribbed, ·3-·5 in. long, black when ripe, about 8 seeded; albumen ruminate.

LUSHAI HILLS, SIBSAGAR, NOWGONG, SYLHET, CACHAR, GOALPARA, GARO HILLS, N. C. HILLS.

Wood cream colour.

Flrs. 10-11. Fr. 12-1.

4. Randia griffithii *Hk. f.* Vern. *Dieng-soh-ladung,* Synt.

An erect shrub or small tree with straggling branches; branchlets marked with prominent hairy ridges indicating the nodes. *Bark* greenish-grey, dark-green underneath the very thin corky layer, ·1 in. thick; spines ascending. *Leaves* 2-5 by ·5-1·5 in., ovate or ovate-lanceolate, acuminate, entire, membranous or thinly coriaceous, glabrous, shining; lateral nerves 6-8 on either half; base acute; petiole ·1-·4 in. long,

margined; stipules subulate. *Flowers* 5-merous in few flowered, sub-sessile terminal cymes; bracts connate. *Calyx* ·25 in. long, funnel-shaped; limb dilated, minutely toothed, deciduous. *Corolla* tube short; lobes elliptic, ·4-·5 in. long. *Ovary* stipitate, lengthening in fruit. *Berries* black, 2-celled, 2-4 seeded, globose, ·25-·35 in. across.

KHASI HILLS.
Flrs. 5-7. Fr. 10.

5. Randia dumetorum *Lamk.* Vern. *Behmona, Mon,* Ass.; *Ruthi, Ruthi a ong,* Mik.; *Rupan hou, Ri'hai-phang, Monraling,* Kuki; *Biskhan hokra,* Mech; *Dieng-makasing-khlaw,* Kh.; *Kotoh-bih,* Darrang; *Biolom,* Sylh.; *Buro-mayna,* Mech; *Th sk ng,* Garo.

A large deciduous shrub or sometimes a small tree with stout axillary spines *Bark* dark-brown or grey, somewhat rough. *Leaves* 1-3·5 by ·8 1·5 in., generally fascicled on arrested branchlets, obovate or oblanceolate, roundish or obtusely short, acuminate or acute, pubescent, rough or glabrous; lateral nerves 5-7 on either half, sub-parallel; base narrowed into a short marginate petiole; petiole ·1-·4 in. long; stipules ovate, acuminate. *Flowers* sub-sessile, ·7-1 in. across, greenish white or yellowish, fragrant, solitary or 2-3 together on short lateral branchlets. *Calyx* strigose; tube ·2-·3 in. long, campanulate; segments variable, ovate or lanceolate or spathulate, foliaceous, as long as the tube. *Corolla* covered with adpressed silky hairs; tube not exceeding the calyx; lobes spreading, oval or oblong. *Stigma* fusiform. *Berry* soft, fleshy, ·1-1·5 in. long, globose or ovoid, yellow when ripe, usually tipped with persistent calyx. *Seeds* compressed, imbedded in a gelatinous pulp.

GOALPARA, NOWGONG GARO HILLS, KAMRUP, N. C. HILLS, KHASI HILLS DARRANG.

Fruit used for poisoning fish and is considered to be one of the best and safest emetics in Indian medicine.

Flrs. 4-5. Fr. Cold season.

6. Randia fasciculata *DC.* Vern. *Horu-moyan, Pulikaint,* Ass.; *Suho,* Mik.

A handsome spreading shrub or a small tree with short axillary spines; branchlets pubescent. *Bark* greenish-grey,

warty, ·16 in. thick, having minute vertical lines, green below the cuticle. *Leaves* 1-8 by ·43 in., oblong-lanceolate, elliptic or ovate, acute or acuminate, entire, membranous, dark-green and shining, glabrous; lateral nerves 9-11 on either half, usually rounded at the base; petiole ·2-·8 in. long; stipules narrow, lanceolate. *Flowers* white, fragrant, bracteate, 1 in. across, usually in 3-flowered cymes at the ends of branchlets, sometimes axillary and fasciculate. *Calyx* pubescent; teeth linear, deciduous. *Corolla* tube slender; lobes broad, oblong, often apiculate, hairy at the base. *Anthers* sub-sessile at the mouth of the corolla-tube. *Stigma* slightly exserted, fusiform. *Berry* purplish black when ripe, globose, ·25 in. across with 10-12 angular seeds.

KHASI HILLS, LAKHIMPUR, CACHAR, NOWGONG, KAMRUP, N. C. HILLS.

Wood cream colour.

Flrs. 3-5. Fr. Cold season.

7. Randia densiflora *Benth.* Vern. *Dieng-iong-blei,* Khasi; *Parsaru,* Kuki.

A tree (60′/45″). *Bark* greyish-brown, smooth, with distant slender horizontal wrinkles, green beneath the cork; mattedly fibrous and reddish-brown inside, soft near cambium, soon turning darkish-brown. *Branchlets* opposite, quadrangular. *Leaves* 2·5-7 by ·6-3 in., bifarious, entire, smooth, elliptic-oblong or lanceolate, acuminate, coriaceous; lateral nerves 5-7 on either half; base acute; petiole ·2-·5 in. long; stipules triangular, acuminate, deciduous. *Flowers* 5 merous, subsessile, pale yellow, ·6-·8 in. across, in much branched leaf opposed scorpioid cymes; bracts persistent. *Calyx* bowl-shaped; teeth triangular, acute. *Corolla* tube ·16 in. long; lobes linear-oblong, twisted to the right in bud; throat hairy. *Anthers* ·25-·3 in. long, radiating from angles of corolla lobes. *Stigma* exserted.

CACHAR, SIBSAGAR, KHASI HILLS, MIKIR HILLS.

Flrs. 12-2. Fr. not seen.

8. Randia Wallichii *Hk. f.* Vern. *Supin-um-soh-arong,* Mik.; *Ching-kabak,* Naga; *Buleng, Saphut,* Kuki; *Shundi* (?)

* Fruit-August, a berry, ·1 in. across. Collected from Desoi Reserve. Sibsagar Divn.—R. N. De.

Cach.; *Dieng-soh-lakhai-shree*, Khasi; *Dieng-sa-sling-khni*, Synt.; *Theng-okri*, Mik.; *Teslem-phang*, Kach.

A tree (up to 50′/24″). *Branches* flexuous. *Bark* greyish to blackish-brown, exfoliating in irregular flakes, ·12-·25 in. thick; inside light brown, irregularly mottled and granular. *Leaves* 2-10·5 by ·5-2·8 in., elliptic, lanceolate, long acuminate, entire, coriaceous, shining above, slightly pubescent beneath, with scattered glandular pits; lateral nerves 10-12 on either half; base narrowed into the petiole (·2-1 in. long); stipules sessile, coriaceous, enclosing buds, caducous. *Flowers* yellowish, fragrant, in leaf opposed or axillary cymes; branches spreading. *Calyx* turbinate; teeth small. *Corolla* ·5 in. across, salver-shaped with slender tube, much shorter than the lobes. *Anthers* in the sinuses of the corolla lobes. *Stigma* entire. *Berries* globose, often speckled with white lenticels, many seeded. *Seeds* peltate; cotyledons small, flat, rounded.

KHASI HILLS, N. C. HILLS, CACHAR, NOWGONG.
Wood cream colour, much prized in Cachar.
Flrs 5. Fr. Cold weather.

25. HYPTIANTHERA W. & A.

Hyptianthera stricta *W. & A.* Vern. *Boldiki*, Garo; *Tantharu-bom-phang*, Mech; *Thingsairangal*, Lushai.

An aromatic evergreen shrub or small tree; stem brown, reticulately fissured; branches thin, 4-angled or somewhat compressed. *Leaves* decussate, 2-7 by ·7-2 in., narrow-elliptic, oblong or linear-lanceolate, entire, somewhat slightly undulate, finely caudate-acuminate, glabrous and shining above, pubescent on nerves beneath when young; lateral nerves 6-7 on either half; base rounded or cuneate; petiole ·15-·5 in. long; stipules caudate-acuminate, persistent. *Flowers* about ·15 in. long, sessile, in dense axillary cymes; bracts minute, lanceolate, acute, ciliate. *Calyx* with a short tube; teeth ovate, acute, hairy inside. *Corolla* shorter than the calyx, tubular; lobes 4-5, twisted. *Anthers* 4-5, sessile, inserted by the back. *Disk* epigynous, annular, pulvinate. *Ovary* 2-celled, with 4-10 pendulous ovules in each cell; style solitary; stigma bifid, white, brush-like. *Berries* ·3 in.

long, more or less globose, crowned by the persistent calyx, black when ripe, juicy. *Seeds* angled and compressed; testa fibrous and plaited; embryo small.

GARO HILLS, DARRANG, SYLHET, LUSHAI HILLS, GOALPARA and KHASI HILLS (Hooker).

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

26. TRICALYSIA A. Rich.

Tricalysia singularis *K. Schum.* Syn. Diplospora singularis Korth. Vern. *Pondonje-bephang, Kehoba-arong,* Mik.; *Thing-sai,* Lush.; *Thingsai-ranga,* Kuki; *Sairangal,* Tipp.; *Gongai-samphet,* Mech; *Khukru, Garo-khukru, Kakoi-chira,* Ass.; *Bol-k'ung-khang, Boljakingsok,* Garo.

A tree 50′/40″ (90 to 100 ft., *Prazer in Cachar*) with resinous fluted stem and narrow crown. *Bark* smooth, greyish-brown; old bark peeling off in pieces easily, having fine vertical fissures; blaze pale or greenish-brown, darkening on exposure; old leaves bright yellow. *Leaves* bifarious, 3-7 by 1-2·5 in., oblong or elliptic-oblong, entire, acuminate, coriaceous, shining above, pale beneath; lateral nerves 6-9 on either half, slender; axil often gland pitted; base cuneate or acute; petiole ·2-·5 in. long; stipules long acuminate, triangular. *Flowers* 4-merous, greenish-white, sub-sessile, about ·6 in. across, often polygamous, supported by connate bracts, in shortly pedunculed cymes mostly from the leaf scars consisting of 4 groups of 3 flowers and a terminal one. *Calyx* teeth enlarging after flowering. *Corolla* green, salver-shaped; lobes 4-5, linear-oblong, throat villous. *Stamens* on the mouth of the corolla tube; filaments short; anthers linear, exserted. *Ovary* 2-celled; stigma spathulate. *Fruit* baccate, cherry-like, ·7-·8 in. across, purplish black when ripe, crowned by the persistent calyx-limb. *Seeds* flattened, imbricated, 4-7.

SIBSAGAR, NOWGONG, LUSHAI HILLS, CACHAR, SYLHET, GOALPARA, GARO HILLS, KAMRUP and N. C. HILLS ascending up to 4,000 ft.

Wood white, compact. Used for posts.

Flrs. 4-5. Fr. Cold season (persists long on the tree).

27. KNOXIA Linn.

Knoxia corymbosa *Willd.* Vern. *lang-haik*, Khasi.

An erect slender annual herb; stem obscurely angled. *Leaves* 1·5-5 by ·5-1 in., lanceolate or linear-lanceolate, acuminate, grey pubescent; lateral nerves 7-9 on either half, ascending, very slender; base narrowed into the short petiole (·1-·3 in long); stipules connate with the petiole into a bristly sheath. *Flowers* 4-merous, light purple, dimorphous, in spicately corymbose lax cymes. *Calyx-segments* equal or nearly equal, one slightly longer; tube persistent. *Corolla* throat villous. *Carpels* connate into a 2-celled ovary; style filiform; stigma 2 lobed; ovules pendulous, solitary in each cell. *Fruit* 4-angled of 2 separating cocci, ripe fruit separating from the persistent columella by a basal perforation. *Seeds* with membranous testa; albumen fleshy; cotyledons very small; radicle superior.

KHASI HILLS ascending up to 4,000 ft

Flrs. 10. Fr. Cold season.

Octotropis terminalis *C. B. Clarke.*

A glabrous shrub; branches quadrangular. *Leaves* petiolate, lanceolate or elliptic, narrowed at both ends; stipules short, persistent, subulate. *Cymes* fasciculate in the axils of the uppermost leaves. *Calyx* margins entire. *Corolla* white; tube narrowly cylindric, ·75 in. long; lobes 5, imbricate. *Anthers* 5, oblong, included in the corolla tube. *Stigma* oblong, subentire, exserted. *Ovary* 2-locular. *Ovule* solitary; the septum which divides the ovary in two cells is exceedingly thin, and probably fails altogether. *There* is certainly no placental thickening near the centre of the ovary and the ovules are attached near its summit.

SIBSAGAR (Nambor forests), NAGA HILLS (No. 40812).
C. B. Clarke Journ. Linn. Soc. XXV. 33, t. 17.

28. CANTHIUM Lam.

Shrubs or small trees, armed or unarmed, erect or climbing. *Leaves* with nerve axils often glandular; stipules connate. *Flowers* small, white or greenish, sometimes polygamous, in axillary fascicles or peduncled corymbose cymes. *Calyx-tube* shortly produced beyond ovary, 4-5 toothed, persistent or deciduous. *Corolla* tube urceolate, campanulate, funnel-shaped or globose with a ring of deflexed hairs within; throat villous; lobes small, 4-5, valvate, at length

reflexed. *Anthers* 4-5, sub-sessile on the throat or mouth of the corolla. *Ovary* 2-celled; style short; stigma large, usually ribbed; ovules pendulous, solitary in each cell. *Drupe* sub-globose or didymous, with 2 pyrenes or 2-celled putamen or 1-celled from abortion. reniform or oblong. *Seeds* oblong; testa membranous; albumen fleshy; embryo elongated with short cotyledons.

Unarmed; flowers pentamerous :—		
Leaves coriaceous. Corolla tube campanulate. Pyrenes more or less tubercled. ..	1.	*C. dicoccum.*
Leaves thinly coriaceous. Corolla tube sub-globose. Pyrenes quite smooth. ..	2.	*C. glabrum.*
Unarmed; flowers tetramerous :—		
Leaves membranous.	3.	*C. gracilipes.*
Armed; flowers pentamerous :—		
Leaves glabrous and glossy.	4.	*C. angustifolium.*
Leaves pubescent.	5.	*C. parvifolium.*

1. Canthium dicoccum *Merr*=C. didymum Roxb.

A low branched tree 55′/60″ or a stout large evergreen shrub with spreading or drooping branchlets which are flattened at the upper extremities, unarmed. *Bark* dark-grey, brittle with vertical cracks, often warty; inside light brown, coarsely mottled with thick deep brown strands; turning dark-brown. *Leaves* bifarious, variable, 3-6 by 1-3 in., entire, elliptic or ovate-lanceolate, abruptly acuminate, coriaceous, quite glabrous, glossy; lateral nerves 3-6 on either half; nerve axils gland pitted; base rounded or cuneate, often unequal; petiole ·3-·5 in. long; stipules variable, long-cuspidate. *Flowers* 5-merous, white, fragrant, in dense axillary often umbellate cymes sessile or shortly peduncled. *Calyx* truncate or obscurely toothed. *Corolla* tube campanulate; lobes lanceolate, rotate, reflexed. *Stamens* on mouth of corolla; filaments short. *Style* long; stigma mitriform. *Fruit* globose, blackish or purple, slightly longer than broad. *Pyrenes* more or less wrinkled or tuburcled, rounded on the back.

SYLHET, N. C. HILLS (Jatinga); KHASI HILLS.

Wood hard, close and even grained, used to some extent for handles of implements. Gamble says that it has a great resemblance to box wood.

Flrs. 12-3. Fr. 5-8.

2. Canthium glabrum *Bl.* Vern. *Bon-theregu*, Sibsagar, *Ticho-okran-arong*, *Jhenemuiarong*, Mik.; *Bathling*, Lush.; *Bolthinking*, Garo; *Ramnisethar*, Kuki; *Bogakalti*, *Bhela*, Ass.; *Longam-chang*, Naga; *Dieng-ri-sai*, Khasi.

A middle sized tree (50′/57″), irregularly fluted, unarmed. *Branchlets* decussate and irregularly fluted; old leaves yellow. *Bark* deep-brown with white patches, corky outside, fibrous, brown and pale inside; blaze striated, red and yellow, turning dirty. *Leaves* 4-7 by 1·5-3 in., bifarious, entire, elliptic, ovate-oblong or oblong-lanceolate, obtuse to abruptly acuminate, thinly coriaceous, glabrous, glossy-green above, paler beneath; lateral nerves 5-7 on either half; nerve axils occasionally gland pitted; tertiary nerves obconic; base rounded or cuneate; petiole ·2-·5 in. long; stipules with broad base, subulate. *Flowers* pentamerous, in shortly peduncled glabrous rather lax cymes. *Calyx* glabrous, about ·5 in. long. *Corolla* tube sub-globose; lobes as long, spreading. *Stigma* mitriform, notched. *Fruit* globose, pyrenes quite smooth, triangular, almost keeled; pericarp fleshy, granular.

SIBSAGAR, LUSHAI HILLS, CACHAR, SYLHET, DARRANG, GOALPARA, GARO HILLS, KAMRUP & KHASI HILLS
Wood yellowish white, very hard, compact.

Flrs. 7-10. Fr. 1-3.

3. Canthium gracilipes *Kurz.*

A scrambling shrub; young branchlets pubescent. *Leaves* 1-3 by ·5-1·8 in., entire, elliptic or ovate or oblong-lanceolate, acuminate, membraneous, glabrous, nerves beneath sparsely puberulous; lateral nerves 5-7 on either half; base acute or rounded; petiole ·1-·2 in. long; stipules subulate, pubescent. *Flowers* small, pentamerous, solitary or in pairs on capillary pubescent pedicels arising from arrested lateral branchlets. *Calyx* glabrous; teeth subulate. *Fruit* bluish-black, slightly compressed, sinuate at the apex; albumen copious.

Garampani, Barpathar SIBSAGAR. Assam species are armed with axillary spines. Not recorded from Assam previously.

Flrs. 4. Fr. 11.

4. Canthium angustifolium *Roxb.*=C. Leschenaultii Wight et Arn. Vern. *Dieng-sia,* Khasi.

A scandent shrub armed with decussate usually opposite, axillary or supra-axillary sharp spines, sometimes slightly armed, branches divaricate. *Leaves* 1·3·6 by ·4-1·3 in., entire, ovate-lanceolate, acuminate, thinly chartaceous, glabrous and glossy; base rounded; lateral nerves 4-6 on either half. *Flowers* pentamerous, dull white, ·5 in. across, in axillary fascicles. *Calyx* turbinate, nearly truncate or with 5 minute teeth. *Corolla* lobes lanceolate, spreading, twisted in bud. *Style* hairy at base; stigma mitriform, bilobed. *Fruit* suborbicular, compressed. *Pyrenes* more or less wrinkled or tubercled, rounded on the back.

N. E. F. TRACT, KHASI HILLS, GARO HILLS.

Flrs. 3. Fr. 8.

5. Canthium parvifolium *Roxb.* Vern. *Sia-soh-ngian,* Khasi.

An erect rigid thorny shrub; stem cinnamon-coloured when young. *Branchlets* hispid-pubescent, long and spreading. *Leaves* ·5-1·5 by ·4-1·4 in., sessile or sub-sessile, yellowish-green when dry, entire, ovate-elliptic, pubescent, sub-acute, thinly chartaceous; lateral nerves 4-6 on either half, ascending, arcuate; base acute or rounded; stipules ovate-lanceolate. *Flowers* 5-merous, sub-sessile, axillary, in clusters. *Calyx* sinuately 5-toothed; teeth minute. *Corolla* sub-globose, glabrous; lobes lanceolate, acute. *Fruit* globose, ·7-·9 in. across. *Pyrenes* more or less tubercled, rounded on the back.

KHASI HILLS, GOALPARA.

Flrs. 3-5. Fr. Cold season.

29. VANGUERIA Juss.

Vangueria spinosa *Roxb.* Vern. *Mainakanta,* Beng.; *Ketkora, Mon,* Ass.; *Thitchkeong,* Garo; *Mon,* Cah.; *Misathei,* Kuki; *Haibi,* Manip.; *Soh-mon, Dieng-soh-myren,* Khasi; *Dieng-sa-matan,* Synt.

A deciduous shrub or small tree. *Bark* brown to deep grey with vertical cracks; blaze yellowish. *Spines* up to

·7 in. long, somewhat supra-axillary; branchlets terete. *Leaves* opposite or sometimes ternate, 1·5-5 by 1-2·75 in., entire, ovate-elliptic or elliptic-ovate, acute or bluntly acuminate, membraneous, more or less glabrous; lateral nerves 6-9 on either half, curving upwards near the margin; nerve axils with tufts of hairs; base shortly cuneate; petiole ·2-·5 in. long; stipules connate, cuspidate from a broad base. *Flowers* greenish white, on short peduncled cymes, which are axillary or supra-axillary or sometimes from small excrescences. *Calyx* 5-toothed. *Corolla* induplicate-valvate in bud; tube short, sub-globose; throat woolly; lobes spreading. *Stamens* sub-sessile; anthers exserted. *Ovary* 5-celled, less often 3-4-celled or 6-celled; style long; stigma lobed; ovules pendulous, solitary. *Fruit* a fleshy drupe, about 1-1·5 in. across, yellowish when ripe, with 3-5 woody pyrenes; embryo central in copious fleshy albumen.

GARO HILLS, SIBSAGAR, K. & J. HILLS, N. E. FRONTIER TRACT, KAMRUP, CACHAR, DARRANG and GOALPARA.

Fruits edible. Leaves are sometimes eaten pounded into a paste.

Flrs. 4-5. Fr. Rainy season.

30. IXORA Linn.

Shrubs or small trees. *Leaves* opposite, occasionally ternate, usually coriaceous; stipules interpetiolar, usually connate. *Flowers* usually 4-(rarely 5-) merous in terminal 3-chotomously branched or corymbose cymes; bracts 2, coriaceous. *Calyx* tube ovoid, small; teeth persistent. *Corolla* tube slender, long; lobes usually shorter than the tube, spreading, often reflexed, twisted in bud. *Stamens* on the mouth of the corolla; filaments obsolete or very short; anthers linear, 2-fid at base, often apiculate. *Ovary* 2-celled; style filiform, exserted; stigma slender, 2 branched, fusiform: ovules solitary in each cell, peltately attached to the septum. *Fruit* globose or sub-didymous, with 2 plano-convex or ventrally concave coriaceous pyrenes. *Seeds* often 1 only (others undeveloped); testa membranous; albumen horny; cotyledons flat, thin; radicle inferior.

Calyx-teeth longer than ovary :—		
Flowers in compact corymbiform cymes, usually sessile. Corolla tube slender :—		
Lateral nerves conspicuous; petiole ·5-1 in. long.	1.	*I. acuminata.*
Lateral nerves slender and obscure; petiole ·2-·6 in. long.	2.	*I. subsessilis.*
Calyx-teeth as long as or shorter than ovary :—		
Flowers in long pedunculate brachiate cymes; young parts pubescent; corolla lobes notched.	3.	*I. villosa.*
Flowers in shortly pedunculate (less than 2 in.) cymes:—		
Lateral nerves up to 14 pairs; petiole ·2 in. long; corolla lobes oblong. ..	4.	*I. parviflora.*
Lateral nerves 12-17 pairs; petiole ·2-·6 in. long; corolla lobes linear (young parts drying black). ..	5.	*I. nigricans.*
Lateral nerves 8-10 pairs; petiole ·2-·3 in. long.	6.	*I. cuneifolia.*
Lateral nerves 24-30 pairs; petiole ·3-·8 in. long.	7.	*I. undulata.*

1. Ixora acuminata *Roxb.*

Shrub or an undershrub, branchlets ribbed or angled. *Leaves* very variable, 4-15 by 2·5-6 in., elliptic or linear-elliptic-oblong, acuminate, coriaceous, glabrous; lateral nerves 9-11 on either half; base usually connate or wedge-shaped; petiole ·5-1 in. long. *Floral* pair of leaves ovate or obovate, sessile, auricled or with rounded base. *Flowers* in sessile or sub-sessile corymbose dense flowered cymes; bracteoles long. *Calyx* glabrous, reddish; teeth lanceolate, much longer than the ovary. *Corolla* white; tube very slender, up to 1·5 in. long, narrowly obovate; mouth villous and pubescent. *Anthers* sessile. *Stigma* fusiform. *Fruit* ellipsoid, up to ·7 in. long.

GOALPARA, SIBSAGAR.

Flrs. 5. Fr. Autumn.

2. Ixora subsessilis *Wall.* Vern. *Deing-jowat,* Khasi.

A shrub or an undershrub, handsome when in flower. *Bark* greyish brown. *Branchlets* greyish-green. *Leaves* 3-6 by ·5-2 in., elliptic-lanceolate, oblanceolate, sharply acuminate,

entire, subcoriaceous, shining, paler when dry; nerves slender and obscure; petiole ·2-·6 in. long; stipules sheathing, long cuspidate. *Flowers* deep red (gradually getting lighter, even white), in terminal sub-sessile corymbiform cymes. *Peduncles* generally geniculate. *Calyx* bright red; segments linear, 3 or 4 times the ovary. *Corolla* very slender, ·75-1·25 in. long; lobes 4, lanceolate, reflexed, acute; mouth glabrous. *Filaments* flattened; anthers slender. *Fruit* 1-2-seeded, crowned with the calyx-teeth; pyrene concave.

SIBSAGAR, CACHAR, MIKIR HILLS, LAKHIMPUR, KHASI & JAINTIA HILLS-ascending up to 4,000 ft.

Flrs. 5. (Sibsagar)-9-10. Fr. 10-12.

3. Ixora villosa *Roxb.*

A shrub. *Branchlets* pubescent or tomentose. *Leaves* very variable, 5-14 by 2-5 in., narrow or broad elliptic, caudate-acuminate, entire, thinly coriaceous, glabrous above, more or less tomentose beneath; lateral nerves 10-12 pairs; base rounded or acute; petiole short; stipules tomentose. *Flowers* white in long peduncled brachiate pubescent cymes. *Calyx-teeth* short, as long as the tube. *Corolla* glabrous; tube very slender; lobes ·3-·4 in. across, notched. *Filaments* subulate; anthers slender. *Style* exserted. *Fruit* size of a pea, red, crowned by the calyx limb. *Seeds* ventrally concave.

Thariaghat (KHASI HILLS); Golaghat, (SIBSAGAR); CACHAR, Kohima Road, Fort Lungleh (up to 4,000 ft.).

Flrs. 4-6.

4. Ixora parviflora *Vahl.*

A small evergreen glabrous tree or shrub with dark-pale greyish often postulate bark; blaze flesh coloured. *Leaves* sub-sessile, 3-6 by 1·5-2·5 in., elliptic or oblong, obtuse or shortly acuminate, entire, coriaceous, dark-green and shining; lateral nerves up to 14 on either half; base rounded or cordate (Assam specimen cuneate or narrowed to the petiole); petiole up to ·2 in. long; stipules cuspidate. *Flowers* white, odorous, sub-sessile, in compact 3-5 branched panicles; buds ellipsoid. *Calyx* lobes minute.

Corolla glabrous; tube ·3-·4 in.; lobes reflexed, usually 4, sometimes 5. *Anthers* tailed. *Style* slightly hairy. *Fruit* size of a pea, reddish or black when ripe.

KHASI HILLS (Mann).

Flrs. 4-5. Fr. 7-8.

5. Ixora nigricans *Bl.* Vern. *Parsim-phoi,* Kuki.

A large evergreen shrub or a tree; stem greyish-brown. *Leaves* 3-6·5 by 1-2 in. (turning black in drying), lanceolate, oblanceolate, elliptic-lanceolate, acute or shortly acuminate, entire, thinly coriaceous, glabrous; lateral nerves 12-17 on either half, inconspicuous, arched; base acute or cuneate; petiole ·2-·6 in. long; stipules cuspidate, bristly. *Flowers* white, scented, in sub-sessile or shortly peduncled brachiate cymes with 2 lanceolate foliaceous bracts at the base of the main peduncles; buds narrowly fusiform. *Calyx* glabrous; teeth triangular, acute, shorter than the ovary. *Corolla* slender, glabrous within and without. *Filaments* slender; anthers almost filiform. *Style* glabrous; stigma with recurved branches. *Fruit* size of a pea, black. *Seeds* plano-convex.

KHASI HILLS, NAGA HILLS, N. CACHAR HILLS (5,000 ft.).

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

6. Ixora cuneifolia *Roxb.*

An evergreen shrub. *Leaves* 6-9 by 2-4 in., elliptic-lanceolate or oblanceolate, shortly acuminate, entire, sub-coriaceous, glabrous above, glabrous or minutely puberulous beneath; lateral nerves 8-10 on either half, arched, terminating in intramarginal veins; petiole ·2-·3 in. long; stipules cuspidate. *Flowers* white, about 1 in. long, sub-sessile, on short peduncled or sub-sessile cyme. *Calyx* glabrous; teeth as long as the tube. *Corolla* tube slender; lobes oblong. Style exserted. *Fruit* size of a pea, red (·3-·4 by ·2-·05 in.). *Seeds* ventrally concave.

SYLHET (De Silva, Hooker); Duffla Hills (Lister) up to 4,500 ft.

Flrs. 4-7. Fr. Cold season.

7. Ixora undulata *Roxb.*

A large evergreen shrub or small tree (25′/10″); young parts puberulous. *Bark* grey, rough; inside light brown, turning darker. *Leaves* 3-8 by 1-2·5 in., elliptic, elliptic-lanceolate or linear-lanceolate, acute or acuminate, mostly with undulate margins, membranous, glabrous, shining; lateral nerves 24-30 on either half, arched; base acute; petiole ·3-·8 in. long, chanelled; stipules broadly marginate with a long cusp. *Flowers* white, scented, in corymbosely panicled lax peduncled brachiate cymes which are jointed at the ramifications; bracts and bracteoles persistent; buds slender, clavate or lanceolate. *Calyx* glabrous; segments persistent, acute, minute. *Corolla* tube slender, up to ·5 in. long; lobes about as long or a little shorter, spreading, reflexed, revolute (valvate). *Filaments* slender; anthers dorsifixed. *Stigma* recurved. *Fruit* ellipsoid, succulent, purplish or blackish grey when ripe, with 2 plano-convex pyrenes.

NOWGONG, GOALPARA, KAMRUP, KHASI HILLS.
Wood hard.

Flrs. 4-5. Fr. 8-9.

31. PAVETTA Linn.

Shrubs or small trees. *Leaves* usually membranous; stipules usually connate in a loose deciduous intrapetiolar sheath. *Flowers* in terminal or axillary 2-3-chotomously branched corymbose cymes; bracteoles small. *Calyx* turbinate or campanulate, segments 4, rarely 5. *Corolla* hypocrateriform; lobes 4, rarely 5, contorted; tube slender, cylindric. *Stamens* 4, rarely 5, on the mouth of the corolla; anthers linear. *Ovary* 2-celled; style slender, long, much exserted; stigma fusiform; ovules solitary in each cell attached to the septa on a prominent placenta. *Fruit* small, baccate, fleshy with 2 ventrally concave pyrenes; testa membranous; albumen horny; embryo curved; cotyledons foliaceous; radicle inferior.

Flowers in spreading corymbose panicles.
Lateral nerves 10-15, glabrous. .. .. *1. P. indica.*

Flowers in corymbose cymes; branches sessile. Lateral nerves 10-15, tomentose. .. .. 2. *P. naucleiflora.*
Flowers in compact capitate cymes. Lateral nerves 7-9. .. .. 3. *P. subcapitata.*

1. Pavetta indica *Linn.* Vern. *Dieng-long-tham, Dieng-pait-parao, Dieng-soh-sim,* Khasi; *Kange,* Nep.; *Khamkhathek,* Garo; *Gobor-hitha, Sam-suku,* Ass.; *Jangtar-long,* Mik.; *Patang-asing,* N.-E. F.

A large deciduous spreading shrub or a small tree (up to 18 ft.), greyish, with slightly rough bark. *Leaves* rather variable, 3-7 by 1-3 in., elliptic-ovate or oblanceolate, obtuse, acute or acuminate, subcoriaceous, pubescent or glabrous; lateral nerves 10-15; base tapering; petiole ·5-1·5 in. long; stipules with acute tip. *Flowers* white, fragrant, in terminal or lateral corymbose panicles; bracts broad, membranous. *Calyx* usually pubescent, more or less truncate or with 4 short teeth. *Corolla* salver-shaped; tube long, very slender; lobes contorted in bud. *Stamens* 4 on the mouth of the corolla; filaments short; anthers exserted; style filiform, exserted, about 1 in. beyond the mouth of the corolla; stigma not divided. *Fruit* globose, glossy, blackish-green.

NOWGONG, N. E. FRONTIER, GOALPARA, DARRANG, CACHAR, GARO HILLS, KAMRUP, LAKHIMPUR, N. C. HILLS.

Flrs. 6. Fr. 12-1.

2. Pavetta naucleiflora *Wall.*

A shrub, all parts densely pubescent. *Leaves* 3-6 by 1-2 in., elliptic, broad-lanceolate or oblanceolate, entire, acuminate, subcoriaceous, more or less tomentose, more so on the nerves beneath; lateral nerves 9-10 on either half; base acute; petioles hairy, ·5-1 in. long. *Flowers* white, long pedicellate on sessile corymbose cymes; branches sessile, hairy. *Calyx* tubular, pubescent; teeth subulate, small. *Corolla* white, ·25-·5 in. long; tube slender; lobes oblong. *Fruit* size of a small pea, black, hispid, ·25 in. across.

SYLHET (Wall Cat. 6171), KHASI HILLS, ASSAM.

Flrs. 1. Fr. Hot season.

3. Pavetta subcapitata *Hook. f.* Vern. *Khem-arkhu,* Kach.; *Mir-arong, Mirchakchu, Usupiban,* Mik.

A shrub. *Bark* brown. *Leaves* 2·5·5 by ·7-2 in., elliptic-lanceolate or elliptic-obovate, caudate-acuminate, entire, glabrous above, finely pubescent beneath; lateral nerves 7-9 on either half, ascending, arched at the margins; base acute or cuneate; petiole ·3-1 in. long. *Flowers* white in terminal sessile compact capitate cymes. *Calyx* puberulous; teeth very short, distinct. *Corolla* tube ·5-·75 in. long. *Style* filiform, much exserted, about 1 in. beyond the mouth of the corolla. *Berry* rounded, siz of a pea.

NOWGONG, SIBSAGAR, KHASI & JAINTIA HILLS (Gomez). Leaves are eaten.

Flrs. 5-6. Fr. Cold season.

32. COFFEA Linn.

Shrubs. *Leaves* opposite, rarely ternate; stipules free, broad. *Flowers* in exillary or terminal fascicles or solitary or axillary cymes. *Calyx* tube short; limb short, often glandular within, persistent. *Corolla* lobes 4-7, spreading, contorted in bud. *Anthers* 4-7, sessile, often recurved and twisted. *Ovary* 2-celled; style filiform, bifid at the apex; lobes linear or subulate; ovules solitary in each cell, peltate on the septum. *Drupe* with 2 plano-convex or ventrally concave coriaceous or cartilaginous pyrenes. *Seeds* concave or grooved ventrally; albumen horny; embryo short, sub-basal; cotyledons cordate, thin; radicle inferior.

Flowers in many flowered fascicles. Corolla tube less than ·5 in. long:—		
Calyx truncate:—		
Glabrous shrub or small tree. ..	1.	*C. arabica.*
Calyx-teeth acute :—		
Pubescent rambling or almost climbing shrub. Seeds ventrally concave.	2.	*C. khasiana.*
Glabrous rambling or almost climbing shrub. Seeds plano-convex. ..	3.	*C. Jenkinsii.*
Flowers solitary or in few flowered fascicles. Corolla tube ·5 in. or longer :—		
Flowers solitary or 1-3 together. Calyx truncate, obscurely 5-toothed.	4.	*C. bengalensis.*
Flowers usually solitary. Calyx many toothed.	5.	*C. fragrans.*

1. Coffea arabica *Linn.* Vern. *Dieng-koffi,* Khasi.

A handsome evergreen shrub or small tree with spreading branchlets. *Leaves* bifarious, 5-7 by 1·2-2·5 in., elliptic to ovate-oblong, shortly acuminate, shining, glabrous; lateral nerves 10-12 on either half, looped and with large gland pits; base narrowed into a short petiole; stipules broadly lanceolate, cuspidate. *Flowers* appearing with the leaves, sub-sessile, 1-3-nate or in axillary cymes subtended by foliaceous bracts. *Calyx* limb truncate. *Corolla* funnel-shaped. *Drupe* purple when ripe, oblong, with 2 pyrenes.

Cultivated in Mahadeo and Dawki (KHASI HILLS).
Yields the well-known coffee beans of commerce.

Flrs. 3. Fr. 12.

2. Coffea khasiana *Hk. f.* Vern. *Nreu-chiang-pui,* Naga; *Dieng-soh-ja-ryngksang,* Synt.; *Dieng-supoh-niuroi,* Khasi.

A suberect shrub (up to 9 ft. in height) with rough greyish or brown finely furrowed branches; twigs and young parts adpressed pubescent. *Leaves* 4 by 1·5 in., oblong or elliptic-lanceolate, caudate-acuminate, sinuate, glabrous above, prominent beneath; secondary nerves 6-8 on either half; tertiaries fine; petiole short, ·2-·25 in. long, stout, pilose; stipules subulate from a base ·3 in. long. *Flowers* ·25 in. long, in many flowered axillary dense much branched capitulate pubescent cymes; bracts and bracteoles opposite, connate below, triangular ovate; pedicels very small. *Calyx* ·05 in. long; teeth pliose, acute. *Corolla* green in bud, ultimately orange; tube ·2 in. long; throat villous; lobes ·05 in. long, triangular. *Stamens* at the throat of the corolla tube; filaments short. *Ovary* 2-celled with one pendulous ovule in each surmounted by an annular fleshy disk; stigma deeply bifid; lobes linear. *Drupe* globose, ·25 in. across, crowned by the persistent calyx teeth. *Seeds* ventrally concave.

KHASI & JAINTIA HILLS, MANIPUR and GOALPARA.

Flrs. 4-7. Fr. 11-2.

3. Coffea Jenkinsii *Hk. f.*

A shrub or a tree (up to 30′/35″) similar to *C. khasiana* but almost enirely glabrous. *Leaves* 4-8 by 1-2 in., variable, narrow-lanceolate to elliptic—lanceolate, entire, caudate-acuminate, membranous, glabrous above, more or less pubescent beneath specially on the nerves; lateral nerves prominent, 6-8 on either half, arcuate; base cuneate or acute; petiole ·1-·3 in. long. *Flowers* in axillary fascicles; *bracts* connate into a tube at the base of the ovary. *Calyx* ·2 in. long, broadly campanulate; teeth small, acute. *Corolla* 4-lobed; tube about ·16 in. long with tufts of hairs in the sinuses of the lobes. *Stamens* 4. *Fruit* ellipsoid, ·3 in. long. *Seeds* plano-convex without the groove.

KHASI HILLS.

Flrs. 3-4. Fr. 7-9.

4. Coffea bengalensis *Roxb:* Vern. *Khum-daude,* Mech.; *Akhaji, Dewamali, Kothnaphul,* Ass.; *Mirthelo, Mirherai, Porkanthu, Lekluru,* Mik.; *Khemsisa-baphang,* Kach.

A deciduous shrub, with slender spreading branches, and pale greyish-brown bark. *Leaves* variable, 2-4 by 1-2·5 in., elliptic or broadly ovate, acute or acuminate, entire, membranous, glabrous, except on the nerves beneath, dull green; lateral nerves 10-15 on either half; base narrowed into short petiole; petiole up to 1·5 in. long; stipules persistent, setaceous, stiff. *Flowers* slender, white, fragrant (appearing with the leaves, occasionally before the appearance of the new leaves), showy, 1-1·8 in. across, solitary or 1-3 together, axillary or at the ends of small branchlets. *Calyx* truncate; teeth minute. *Corolla* salver-shaped; tube short, twisted in bud. *Anthers* dorsifixed, apiculate. *Drupe* subglobose or ovoid, blackish, sub-didymous. *Seeds* grooved.

KHASI HILLS, GOALPARA, KAMRUP, NOWGONG, DARRANG, SIBSAGAR, LAKHIMPUR.

The seeds are used as substitute for coffee. Often found flowering all the year round.

Flrs. 2-5. Fr. 10-12.

5. Coffea fragrans *Wall. mss.*

A deciduous shrub, stem glabrous. *Leaves* 2-4 by 1-2 in., elliptic, elliptic-lanceolate, blunt or rounded; glabrous, pale beneath; lateral nerves conspicuously raised, 4-5 on either half, slender, arched. *Flowers* fragrant, white, subsolitary, 5-merous, appearing with the leaves. *Calyx* limb many toothed. *Corolla* tube ·6-1 in. long. *Drupe* didymous.

SYLHET (Gomez).

33. LEPTODERMIS Wall.

Leptodermis Griffithii *Hk. f.*

A rigid much branched shrub (8 ft.), fœtid when bruised. *Leaves* opposite, several pairs often approximate on arrested branchlets, ·3-1·5 by ·2-·5 in., elliptic-lanceolate, acute, entire, subcoriaceous, scaberulous above, almost glabrous beneath, but puberulous along the nerves; lateral nerves 2-3 on either half; base narrowed into the petiole; petiole up to ·4 in. long; stipules persistent, small. *Flowers* usually 5-merous, white, almost sessile, terminal with a pair of connate acuminate bracts. *Calyx-teeth* nearly glabrous, lanceolate. *Corolla* funnel-shaped, pubescent outside, ·6 in. long, densely white, hairy within; lobes valvate with inflexed edges. *Stamens* inserted on the corolla throat; anthers 5, oblong, sub-sessile. *Ovary* 5-celled; style slender, long, with 5 feathery arms; ovules solitary in each cell, basal, erect. *Calsule* 5-valved to the base, ·15 in. long, 5 seeded. *Seeds* enveloped in a loose reticulate fibrous covering.

MANIPUR, KHASI HILLS, up to 5,000 ft.

Flrs. 6-7. Fr. Beginning of cold season.

34. PÆDERIA Linn.

Slender twining shrubs, fœtid when bruised; branches terete, flexuous; stipules intrapetiolar, triangular, deciduous. *Flowers* 4-5-merous, in axillary and terminal 2-3 chotomously branched panicled cymes. *Calyx* persistent. *Corolla* tubular or funnel-shaped, pubescent; lobes valvate in bud with inflexed crisped margins. *Anthers* sub-sessile on the corolla

tube, linear-oblong. *Ovary* 2-celled; style slender; stigmas 2, capillary twisted; ovules solitary in each cell, basal, erect. *Fruit* compressed or globose; epicarp thin, fragile, shining, separating from 2 orbicular or oblong dorsally compressed membranous or coriaceous pyrenes. *Seeds* much compressed dorsally; testa adnate to the pyrene; cotyledons large, foliaceous, thin.

Fruit much compressed; pyrenes separating from a filiform carpophore. Ripe seeds broadly winged.	1. *P. fœtida.*
Fruit subglobose; pyrenes not separating from a filiform carpophore Ripe seeds not winged.	2. *P. tomentosa.*

1. Pæderia fœtida *Linn.* Vern. *Makunda-lot*, Sylh.; *Paduri-lata*, *Padri-lewa*, Ass.; *Madot-thi*, *Pashum*, Garo; *Doukhi-Bondung*, Mech; *Sam-khi-phu*, Kach; *wei-nam-brang*, Kuki; *Mei-in-tung*, *Mei-soh-masem*, Khasi.

A slender wiry fœtid climber, winding anti-clock-wise. *Leaves* opposite, 2·5·5 by ·6-2·5 in., elliptic-ovate, oblong-ovate or lanceolate, shortly acuminate, entire, membranous, glabrous; lateral nerves 5-7 on either half; nerve axils often hairy; base rounded or sub-cordate; petiole 1-3 in. long. *Flowers* greyish purple, with reddish purple mouth, in axillary and terminal cymose panicles; cyme branches opposite. *Calyx* teeth small, usually triangular. *Corolla* funnel-shaped; tube glandular hairy within. *Fruit* ellipsoid, reddish, compressed; pyrenes with a board wing.

N. E. FRONTIER, N. C. HILLS, CACHAR, SYLHET, NOWGONG, DARRANG, KAMRUP, GOALPARA, GARO HILLS, KHASI HILLS.

The decoction prepared from the leaves is considered wholesome and nutritive. The whole plant is regarded as a specific for rheumatic affections. The juice of the leaves is astringent and is a specific for diarrhœa and dysentery.

Flrs. 7-10. Fr. Cold season.

2. Pæderia tomentosa *Bl.* Vern. *Bud-in-tung*, Khasi; *Buking-bepuk*, Miri; *Doukhi-bondung*, Mech; *Oasibu*, Mik.

A slender climber. *Leaves* opposite, ·2-4·5 by 1-2·5 in., ovate to ovate-lanceolate, acute or acuminate, entire, membranous; usually glabrous, sparsely pubescent or

subtomentose; base usually subcordate; petiole ·5-2·5 in. long. *Panicles* often scorpoid. *Calyx* small. *Corolla* scurfy-tomentose or velvety. *Fruit* subglobose, ripening yellowish-brown; pyrenes 2, orbicular, much compressed.

N.-E. FRONTIER TRACT, DARRANG, SIBSAGAR, KAMRUP, GOALPARA, KHASI HILLS, up to 6,000 ft.

Flrs. 7. Fr. Cold season.

Pæderia Cruddasiana *Prain.*

A climber. *Leaves* 2-5 by 1-2·5 in., opposite, ovate, acute; base truncate. *Petiole* 1-1·25 poll long. *Flowers* in axillary or terminal paniculate cymes; bracteoles subulate. *Calyx* segments 5, short, triangular; tube campanulate. *Corolla* puberulous outside, densely tomentose inside. *Fruit* ·25 by ·3 in., egg-shaped, uncompressed, narrowed upwards from the middle.

LUSHAI HILLS, GARO HILLS.

35. MORINDA Linn.

Erect or climbing shrubs or trees. *Leaves* opposite, rarely ternate; stipules connate, sheathing. *Flowers* white, axillary or terminal in simple or panicled or umbellate peduncled heads; the calyces more or less connate. *Calyx-tube* short; limb truncate, obscurely toothed. *Corolla* lobes 4-7, coriaceous valvate. *Stamens* 4-7; filaments short; anthers linear and oblong. *Ovary* 2 or sometimes spuriously 4-celled; style slender with 2 stigmatic lobes; ovules solitary, ascending from a sub-basal placenta on the septum. *Fruit* a syncarpium formed by the succulent enlarged calyces enclosing many- 1-seeded pyrenes, sometimes cohering in a 2-4-celled putamen or occasionally nearly free drupels. *Seeds* obovoid or reniform; testa membranous; albumen fleshy or horny; radicle inferior.

Corolla 5-7-merous, tube up to 1 in. long. Leaves 4-15 in. long.	1. *M. angustifolia.*
Corolla 4- (rarely 5-) merous; tube less than ·5 in. long :—	
Diffuse climbing shrub; branches usually glabrous. Syncarpium irregularly lobed, ·25 in. across.	2 *M. umbellata.*
Climbing shrub, more or less hirsute. Syncarpium deep orange, ·8 in. across. ..	3. *M. villosa.*

1. Morinda angustifolia *Roxb.* Vern. *Dieg-nong, Dieng-siroi, Dieng-shongrei,* Khasi; *Asu-goch, Asu, Akalbih, Ass.; Changmi-rongbi,* Duff.; *Kechan-bophang, Cheng-long-phang, Jeng-long-phang,* Kach.; *Jang-tarlong, Tarlong-arong,* Mik.; *Ralum,* Tipp.; *Holdiruk,* Sylh.; *Asou, Asou-biphang,* Mech.; *Chhennong, Chhengrong,* Garo; *Asu,* Jharua.

A large shrub (18′/12″) or a small tree. *Bark* greyish, exfoliating in thin pieces; blaze whitish. *Leaves* 4-15 by 1·5-5·5 in. long, narrow-lanceolate or oblanceolate, entire, long acuminate, membranous, more or less puberulous, but upper surface glabrescent with age; hairs branched on the nerves beneath; lateral nerves 10-15 on either half, looped within the margin; tertiaries prominent, oblique; petiole ·2-1·5 in. long; stipules acute. *Flowers* fragrant, usually 5-merous, in axillary on leaf opposed pedunculate globose heads, ultimately elongating in fruit. *Calyx* nearly truncate or obscurely toothed. *Corolla* salver-shaped; tube up to 1 in. long. *Fruit* turbinate, not confluent, almost white, structure of the pyrene is characteristic.

SYLHET, KAMRUP, GOALPARA, GARO HILLS, SIBSAGAR, LAKHIMPUR, DARRANG and KHASI & JAINTIA HILLS, ascending up to 4,000 ft.

The root is used for dyeing.

Flrs. 1-5. Fr. 6-9.

2. Morinda umbellata *Linn.*

A diffuse shrub with long switchy climbing branchlets; internodes of young shoots long. *Leaves* variable, 2·5-5·5 by ·8-2 in., elliptic, oblong or lanceolate, sometimes obovate, acuminate, entire, membranous, usually glabrous; lateral nerves 6-8 on either half; base acute; petiole ·3-·5 in. long; stipules sheathing. *Flowers* heads in terminal umbels. *Peduncles* sparingly pubescent. *Calyx* limb a mere rim only, truncate. *Corolla* tube short, hairy within. *Syncarpium* irregularly lobed, ·25 in. across; pyrenes pyriform. *Seeds* not winged.

KHASI HILLS (up to 4,000 ft.).

Flrs. 9. Fr. 10-11.

3. Morinda villosa *Hk. f.*

A climbing shrub. *Branches* more or less hirsute, longitudinally ribbed. *Leaves* 1·5-4 by 1-1·8 in., elliptic-obovate or elliptic-lanceolate, acuminate, entire, membranous, pubescent above, hirsute beneath, pale greenish when dry; lateral nerves prominent, 10-15 on either half; base narrowed into the petiole. *Flowers* usually 4-5-merous in terminal long pedunculate umbels. *Corolla* short. *Drupes* confluent. *Syncarpium* deep orange, ·8 in across.

KHASI HILLS, CACHAR.

Flrs. 4-5. Fr. 9-10.

36. DAMNACANTHUS Gærtn.

Damnacanthus indicus *Gærtn.*

A small rigid spinous shrub or undershrub with spreading braches; stem pubescent. *Spines* stipulary, ·5-1·3 in. long, slender, sharp, brown. *Leaves* ·5-1·8 by ·4-·8 in., sub-sessile, ovate, sharply acute, entire, glabrous, rounded at the base; lateral nerves about 3 on either half, obscure. *Flowers* 4-5-merous, bracteate, white, about ·1 in. long, axillary, solitary or in pairs. *Calyx-tube* conical, ribbed; teeth triangular. *Corolla* funnel-shaped; throat bearded; lobes triangular-ovate, valvate in bud. *Stamens* on throat of corolla; fiaments short; anthers exserted, connective broad. *Ovary* 2-4-celled; style filiform; stigma cleft; ovules solitary in each cell. *Drupe* globose, size of a small pea with 1-2 (?) plano-convex pyrenes; albumen copious, horny.

MISHMI HILLS, KHASI HILLS (Mawphlong—U. Kanjilal). Alt. 6,000 ft.

Fr. 9.

37. PRISMATOMERIS Thwaites.

Prismatomeris albidiflora *Thw.* Vern. *Dieng-soh-sri,* Kh.; *Khabanpelie,* Lushai; *Ramkha,* Tipp.; *Khemdoudi, Rammali,* Kuki; *Jangtarlong,* Mik.

A large evergreen shrub (10′/15″) with tetragonous compound divaricating branchlets. *Bark* yellowish grey; blaze white. *Leaves* 2-5 by ·7-2 in., lanceolate to elliptic-

lanceolate, entire, acuminate, coriaceous; lateral nerves slender, 6-9 on either half; base narrowed into the petiole; petiole ·2-·5 in. long; stipules cuspidate. *Flowers* 4-5-merous, whitish, fragrant, unisexual, in axillary fasciculate cymes, occasionally in pedunculate umbels supported by leaf like bracts; pedicels long, filiform. *Calyx* cup-shaped, almost truncate; teeth very small. *Corolla* tube 1 in long, cylindric; lobes ·3 in., valvate in bud, pubescent; throat minutely pubescent. *Stamens* on the throat of the corolla tube; filaments short; anthers linear, included. *Ovary* 2-celled; ovules solitary, pendulous; style linear; stigma 2-cleft. *Fruit* globose, ·25 in. across, purplish black when ripe, 1-2-celled, 1-2-seeded. *Seeds* ventrally excavated; testa membranous; embryo lateral; albumen horny; cotyledons reinform; radicle inferior.

SIBSAGAR, GOALPARA, NOWGONG, N. C. HILLS, SYLHET, LUSHAI HILLS, KHASI HILLS, ascending up to 4,000 ft.

Wood cream coloured. Juice of leaves is used for stomach ache.

Flrs. 5. Fr. 10-1.

38. PSYCHOTRIA Linn.

Shrubs or small trees, rarely herbs, erect or occasionally climbing. *Leaves* opposite, rarely whorled; nerve axils often pitted; stipules intra-petiolar, sometimes connate, often with axillary glandular hairs. *Flowers* in terminal cymes, heads or fascicles (rarely axillary). *Calyx-teeth* short; limb deciduous or persistent. *Corolla-tube* short, straight; throat usually hairy; lobes 5, rarely 4 or 6, valvate in bud. *Stamens* equalling corolla lobes, inserted at the mouth or throat of the corolla; anthers oblong or linear, included or exserted. *Ovary* 2-celled; ovules solitary in each cell, basal, erect, anatropous; style short with 2 branched stigma. *Fruit* a drupe with 2 plano-convex pyrenes, smooth or furrowed; each 1-seeded. *Seeds* plano-convex, ventrally flat or grooved; testa thin; albumen hard, sometimes ruminate; embryo small; cotyledons leafy; radicle inferior.

Pyrenes plano-convex, no dorsal ridges, no ventral groove. Cyme-branches opposite. .. 1. *P. adenophylla.*

Pyrenes plano-convex, dorsal ridges absent or obscure with frequently a T-shaped ventral groove :—

Intramarginal nerves conspicuous :—		
Calyx-teeth linear, ciliate :—		
Cymes small, axillary or terminal, short peduncled.	2.	*P. calocarpa.*
Calyx-teeth short, triangular :—		
Cymes trichotomous, long peduncled, terminal.	3.	*P. Thomsonii.*
Intramarginal nerves not conspicuous :—		
Cymes long peduncled, corymbiform:—		
Calyx obscure. Corolla throat villous.	4.	*P. denticulata.*
Calyx obconic. Corolla throat bearded with long stiff hairs. ..	5.	*P. silhetensis.*
Cymes sessile or short peduncled, subcorymbiform :—		
Corolla ·1 in. long. Fruit red, ·25 in across.	6.	*P. montana.*
Pyrenes with 4 sharp dorsal ridges :—		
Leaves membranous; lateral nerves 10-14.	7.	*P. erratica.*
Leaves chartaceous; lateral nerves 14-18.	8.	*P. fulva.*
Pyrenes with 1 sharp dorsal ridge. Calyx-teeth obscure.	9.	*P. symplocifolia.*

1. Psychotria adenophylla *Wall.* Vern. *Dieng-lathyllong-khlo, Dieng-mynro-saliang,* Synt.

An evergreen glabrous shrub. *Leaves* turning yellowish when dry, 3-6 by 1-2 in., elliptic, elliptic-lanceolate or obovate-oblong, entire, coriaceous, bluntly acuminate, glabrous; lateral nerves 12-16 on either half, pale yellow, prominent on lower surface with grandular pits at the axils; petiole ·2-·3 in. long; stipules at base of inflorescence almost tubular, truncate. *Flowers* small, whitish, pedicellate or sub-sessile, in usually terminal pedunculate racimiform elongate cymes; branches of inflorescence opposite, short; bracts caducous. *Calyx* almost truncate; teeth obscure. *Corolla* lobes valvate in bud; throat bearded with a dense fringe of white hairs arching over the ovary. *Fruit* ovoid, ·25-·3 in. across, purplish black when ripe; pyrenes plano-convex; albumen ruminated.

N. C. HILLS, K. & J. HILLS, ascending up to 4,000 ft.

Flrs. 5. Fr. 10-11.

2. Psychotria calocarpa *Kurz.*=P. Viridiflora Reinw.

An evergreen semi-herbaceous undershrub (about 6 ft. high); young parts puberulous. *Leaves* variable, 4-10 by 1·5-4 in., elliptic-lanceolate, obovate or ovate-oblong usually entire acuminate, thinly coriaceous, ultimately glabrate above, puberulous beneath with cristate hairs; lateral nerves 11-13 on either half, prominent, arcuate at the margin, subparallel; base narrowed into the petiole; petiole ·5-1·5 in. long; stipules 2 cleft, caducous, hyaline. *Flowers* whitish-yellowish, in axillary terminal peduncled umbellate cymes. *Calyx* teeth 4, cilate. *Corolla* white; throat villous; tube short. *Fruit* yellow when ripe, ultimately turning red; pyrenes obscurely 4 ribbed dorsally.

SIBSAGAR, CACHAR, N.-E. F. TRACT, NAGA HILLS, LUSHAI HILLS, KHASI HILLS, ascending to 4,000 ft.

Flrs. 5. Fr. 10-12.

2. Psychotria Thomsonii *Hk. f.*

A small evergreen semi-herbaceous bush; stem whitish. *Leaves* 4-6 in. long, narrow-elliptic, serrulate, acuminate, subcoriaceous, glabrous but pubescent along midrib; lateral nerves strong, joined by a prominent intermarginal vein; base cuneate; petiole ·3-·6 in. long; stipules ·4-·6 in. long, ovate, membranous. *Inflorescence* terminal. *Fruit* ellipsoid, pointed at both ends, ·5 by ·2 in.

KHASI HILLS, NAGA HILLS, ascending up to 5,500 ft.

Fr. 9-10.

4. Psychotria denticulata *Wall.*

A shrub up to 8 ft. high with thick subherbaceous branchlets. *Leaves* 4-9 by 3-5 in., slate coloured when dry, broadly elliptic, obovate or oblanceolate, shortly acuminate, entire, coriaceous, glabrescent above, more or less puberulous beneath; main lateral nerves about 15 on either half, arcuate; intramarginal veins faint; pits on the nerve axils minute or absent; base attenuate; petiole ·5-1 in. long; stipules large, membranous, broad with 2 cuspidate tips. *Flowers* greenish, in long peduncled terminal or axillary pubescent corymbiform cymes; peduncle 2-6 in. long, gene-

rally nattened. *Calyx* teeth obscure. *Corolla* tubular; tips of lobes incurved, slightly imbricate in bud; throat villous. *Fruit* globose (·2 in. across), size of a small pea; pyrenes plano-convex, smooth.

KAMRUP, KHASI HILLS.

Flrs. 5-9. Fr. 12-1.

5. Psychotria silhetensis *Hk. f.* Vern. *Soh-um*, Khasi.

A shrub with short branches. *Leaves* 4-10 by 4-6 in., elliptic, oblong-elliptic, entire, shortly acuminate, coriaceous with a velvety sheen above, glabrate or sparingly puberulous beneath; lateral nerves prominent, sub-parallel, 14-18 on either half; base cuneate, terminating in a stout petiole; petiole ·5-1·25 in. long. *Flowers* in axillary or terminal pedunculate more or less pubescent cymes. *Calyx* obconic. *Corolla* tube short, throat bearded with erect hairs. *Fruit* globose or ellipsoid, ·3-·5 in. across; pyrenes with a deep T-shaped ventral groove on back; albumen uniform.

LAKHIMPUR, SIBSAGAR, KHASI HILLS, ascending up to 4,000 ft.

Flrs. 4. Fr. 11-1.

6. Psychotria montana *Bl.*

A small evergreen glabrous shrub. *Leaves* 3-8 by 1-3 in., elliptic or oblong-lanceolate, acuminate, membranous, glabrous; lateral nerves slender, 7-9 on either half, arcuate; base tapering in a slender petiole ·5-1·5 in. long. *Flowers* whitish, in terminal or axillary subcorymbiform cymes. *Calyx* obscurely toothed. *Corolla* tube elongate; throat bearded. *Fruit* ovoid-oblong, ·3-·5 in. long, red; pyrenes plano-convex, scarcely ridged on the back; albumen uniform.

GOALPARA to SADIYA, SYLHET, SIBSAGAR, KHASI HILLS, ascending up to 2,500 ft.

Flrs. 5. Fr. 2.

7. Psychotria erratica *Hk. f.* Vern. *Thingpispu, Jogwansoh-arong, Chehogwai-arong*, Mik.

An evergreen erect shrub. *Bark* greyish, smooth, thin; blaze light red. *Leaves* 2·5-7·5 by 1-2·5 in., lanceolate,

elliptic-lanceolate, entire, acuminate, membranous, glabrous; lateral nerves slender, 10-14 on either half; base narrowed into the petiole; petiole ·3-·7 in. long; stipules usually 2-cleft, recurved. *Flowers* in sessile, terminal or axillary cymes, trichotomously branched; bracts lanceolate. *Calyx* teeth longer than the tube. *Corolla* tube short, hairy within. *Fruit* succulent, up to ·25 in. across, globose, reddish-yellow; pyrenes with 4 dorsal ridges. *Seeds* undulated.

SIBSAGAR, LAKHIMPUR, N. C. HILLS, KHASI HILLS, ascending up to 5,000 ft.

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

8. Psychotria fulva *Ham.* Vern. *Ja-lai,* Khasi.

A shrub or an undershrub, lower part of stem grey, upper green. *Leaves* decussate, 4·5-10·5 by 2·5-5 in., soft, elliptic, ovate, oblong or obovate, oblanceolate, acuminate, entire, chartaceous, glabrous, somewhat glabrescent beneath; lateral nerves 14-18, subparallel, prominent below, petiole ·3-1 in. long, stipules bifid. *Flowers* in axillary or subterminal compact usually peduncled capitate cymes: *Calyx* teeth persistent, lanceolate. *Corolla* tube short; throat villous. *Fruit* elongate, ellipsoid or ovoid, yellow when ripening and then turning tan-red; pyrenes dorsally 4-ridged.

CACHAR, MANIPUR, KHASI HILLS ascending up to 4,000 ft.

Flrs. 1. Fr. 12.

9. Psychotria symplocifolia *Kurz.*

An evergreen shrub 8-10 ft.; stem grey. *Leaves* turning yellowish when dry, 2-5 by ·5-1·5 in., elliptic, lanceolate or elliptic-obovate, entire, caudate-acuminate, coriaceous, glabrous, somewhat glauscescent; lateral nerves 10 on either half, rather slender, gland pitted, mainly at the axils of the nerves; petiole ·1-·4 in. long; stipules obovate, ·25 in. long, with a long slender and subulate tip. *Flowers* in terminal (rarely axillary) peduncled trichotomous cymes; branches slender, 1·5-2·25 in. long. *Calyx* teeth obscure. *Corolla tube* short; throat villous. *Fruit* black when ripe,

4-gonous when dry; pyrenes plano-convex with one sharp dorsal ridge; albumen uniform.

KHASI & JAINTIA HILLS, ascending up to 6,000 ft.

Flrs. probably rainy season. (?) Fr. 10-12.

Psychotria subintegra *Hk. f.*=Grumilea subintegra W. & A. 432. A large shrub, glabrous. *Leaves* 4-6 by 1·5-2 in., elliptic-lanceolate, bluntly acute or obtuse, membranous, glabrous; lateral nerves 6-8 on either half; base acute; petiole 1-1·5 in. long; stipules broad, caducous. *Flowers* in pedunculate corymbiform cymes; lower pair of cyme branches long-spreading; flowers capitate in ultimate branches. *Calyx-teeth* short. *Corolla-tube* funnel-shaped; mouth villous. *Fruit* globose, smooth, ·2 in. across.

LAKHIMPUR (Jeypore).

Flrs. Hot season. Fr. 7.

39. CHASALIA Comms.

Shrubs or small trees. *Leaves* usually membranous and glabrous; stipules bild. *Flowers* in terminal cymes; bracts and bracteoles small. *Flowers* small, white or pinkish. *Calyx* small, campanulate; tube ovoid or sub-globose; teeeth 5, short. *Corolla* long, tubular, slender, usually curved; lobes 5, short. *Stamens* 5, subsessile in the corolla tube. *Disc* large. *Ovary* 2-celled; ovule 1 in each cell, erect; style bifid. *Fruit* dry or slightly fleshy, of 2 ventrally grooved pyrenes. *Seeds* orbicular, ventrally concave; testa membranous; albumen horny; cotyledons broad; radicle inferior.

Corolla 1 in. long; petiole ·5-1·3 in. Fruit ·5 in. across.	1. *C. ambigua.*
Corolla ·7 in. long; petiole ·4-·9 in. Fruit ·2 in. across.	2. *C. sp.*

1. Chasalia ambigua *W et A*=**Chasalia curviflora** Thw. Vern. *Lamlopinemtu,* Mik.; *Titahukuta,* Ass.

A shrub (up to 8 ft. high); young part succulent or subherbaceous. *Bark* grey, thin, smooth; blaze white. *Leaves* variable, 5-11 in., elliptic-obovate or oblanceolate, shortly acute or acuminate, occasionally caudate-acuminate, with obscurely recurved margins, membranous, glabrous;

lateral nerves 7-11 on either half, subparallel, arcuate at the margin; tertiaries obscure; base narrowed into the petiole; petiole ·5-1·3 in. long; stipules variable, usually bifid. *Flowers* white, tipped pinkish, in trichotomously branched peduncled cymes, dimorphic, (anthers exserted; stigma included or the reverse). *Calyx* minute, blackish. *Corolla* 1 in. long; tube slender, curved, white with a dash of pink at the extremity of the lobes; throat yellow, hairy inside; disc prominent. *Fruit* ·5 in. across, subglobose, more or less didymous, purplish black; pyrenes dorsally compressed.

SIBSAGAR, GOALPARA, NOWGONG, DARRANG, LAKHIMPUR, KHASI HILLS, ascending up to 5,000 ft.

Flrs. 4-5. Fr. Cold season.

2. Chasalia *sp novo ?*

A shrub about 18 ft. high. *Leaves* 4-8 by 1·5-4 in., elliptic or broadly obovate, entire, abruptly acuminate, rather membranous, glabrous; lateral nerves 6-10 on either half, arcuate; base narrowed into the petiole or cuneate; petiole ·4-·9 in. long. *Flowers* more or less pinkish, in terminal short branched cymes. *Calyx* small; teeth ovate-acute. *Corolla-tube* ·7 in. long. *Fruit* globose, blackish, ·2 in. across.

SIBSAGAR, NAGA HILLS, KHASI HILLS, ascending up to 4,000 ft.

Flrs. 5-6. Fr. Rainy season.

The above is described from sheets marked C. assamica in the herbarium of the Royal Botanic Garden, Sibpur. It appears to be a variety of C. ambigua *W. et A.*

Chasalia lushaiensis *Fischer.* Vern. *Ampangtham,* Garo.

A small tree; branches round, fistulous. *Leaves* 4·8-12 *by* 1·2-2·8 in., opposite, elliptic-lanceolate or falcate-acuminate, membranous, glabrous; nerves prominent; lateral nerves 20 on either half, obscure above, prominent below; attenuate at base; petiole ·2-1 in. long; stipules conjoint, caducous. *Cymes* densely flowered, pendunculate, glabrous, in terminal panicles; bracts cuspidate, ovate, 2·8 in. long, bracteole clavate or ciliate; buds narrow clavate, 5 costate, upto ·4 in. long. *Calyx* cupular; segments 5, triangular, acute, whitish red at the apex. *Stamens* 5, inserted in the middle of corolla tube; filaments short, subulate; anthers linear, bilobed at base, dorsifixed. *Ovary*

truncate, conical, apex concave, 2-locular; style filiform; stigma 2, elongate, subulate. *Fruit* sub-globose, more or less didymous, smooth, black.

LUSHAI HILLS 200 ft. (Mrs. Parry 180). GARO HILLS, 4,000 ft. (Mrs. Parry 790, 792).

The original name was Gærtnaria lushaiensis—Fischer (Loganiaceæ) but now transferred to Rubiaceæ and as C. lushaiensis—Fischer (Kew Bull., 1932).

Fr. 10.

40. SAPROSMA Blume.

Saprosma ternatum *Hk. f.* Vern. *Bhedeli,* Ass.; *Thing-we-namjai,* Kuki; *Thaibreng-jola,* Kach.; *Dieng-so-eit-nai,,* Khasi.

An evergreen shrub or small tree (26′/6″), all parts glabrous, branchlets angled. *Bark* greyish-brown having minute vertical fissures, ·25 in. thick, brown below the cuticle; blaze cream colour. *Leaves* usually ternately whorled, with fœtid smell, coriaceous, glabrous on both surfaces, sparingly scaberulous beneath on the nerves and occasionally on the midrib; lateral nerves 7-8 on either half; tertiaries subparallel, transverse; base acute; petiole ·2-·5 in. long; stipules very long, lanceolate with needle-like points, deciduous. *Flowers* white, in trichotomous or corymbosely fasciculate cymes. *Calyx* truncate or 4-6 toothed. *Corolla* funnel-shapped; lobes 4, valvate in bud. *Stamens* as many as corolla lobes, on the throat of the corolla; anthers subsessile. *Ovary* 2-celled; style filiform; stigmatic arms 2, linear. *Fruit* black when ripe, succulent, crowned by the conical disc, girted by the calyx-teeth, 1-seeded, very rarely 2.

LAKHIMPUR, SIBSAGAR, KAMRUP, CACHAR, N. C. HILLS, KHASI & JAINTIA HILLS, ascending up to 4,000 ft.

Flrs. 5-7. Fr. Cold season.

41. LASIANTHUS Jack.

Shrubs, often fœtid. *Branches* terete, compressed at the nodes. *Leaves* distichous with arching nerves and close-set tertiaries; stipules usually broad. *Flowers* small in axillary, rarely peduncled, often bracteate clusters, cymes or heads.

Calyx-tube short, 3-7 toothed, persistent. *Corolla* funnel or salver-shaped, lobes 3-7, valvate; throat villous. *Stamens* 4-6 on throat of corolla; filaments short; anthers included, often apiculate. *Ovary* 4-9 celled; style short; stigma 3-9 armed, short; ovules solitary in each cell, erect. *Drupe* small with 3-9 triquetrous 1-seeded pyrenes; testa membranous; albumen fleshy; embryo terete; radicle inferior.

Cymes sessile or nearly so, axillary; bracts conspicuous :—
- Outer bracts exceeding the flower :—
  - Bracts ovate, ·5-2 in. long, Corolla tube ·16 in., yellowish white. .. 1. *L. cyanocarpus.*
  - Bracts subulate, ·25-·5 in. long. Corolla ·7 in. long. .. .. 2. *L. sikkimensis.*
  - Bracts ·5-1 in. long, subulate. Corolla tube ·16 in. long, white. .. .. 3. *L. Wallichii.*
  - Bracts ·3-·7 in. long, subulate, filiform, hispid. Corolla tube ·6 in. long. .. 4. *L. tentaculatus.*
- Outer bracts much shorter than flowers :—
  - Bracts orbicular, coriaceous. .. 5. *L. tubiferus.*

Cymes sessile or nearly so, axillary; bracts obscure or 0 :—
- Calyx toothed :—
  - Segments elongate, lanceolate :—
    - Fruit ·25 in. across; pyrenes 5 (4 Hooker). .. .. 6. *L. lucidus.*
    - Fruit ·16 in. across; pyrenes 6. .. 7. *L. Hookeri.*
  - Segments minute (subulate or triangular) :—
    - Calyx glabrous. Corolla about ·25 in.; leaves smaller. .. 8. *L. inconspicuus.*
    - Calyx puberulous. Corolla about ·5 in.; leaves larger. .. .. 9. *L. lancifolius.*

Cymes peduncled :—
- Lateral nerves 8-11 on either half. Fruit ·25 in. across; pyrenes 4. .. .. 10. *L. longicauda.*
- Lateral nerves 5-7 on either half. Fruit ·5 in. across; pyrenes 6. .. .. 11. *L. Biermanni.*

1. Lasianthus cyanocarpus *Jack.*

An evergreen shrub up to 12 ft. high; stem dark-grey; blaze light brown, all young parts rusty hirsute. *Leaves* 3·5-10 by 1·2·5 in., elliptic, lanceolate-oblong or lanceolate,

long acuminate, entire, thinly coriaceous, more or less glabrate above, brown hirsute beneath, specially on the nerves, base acute or rounded, occasionally oblique or unequal; petiole hirsute, ·2-·5 in. long; stipules acute, hirsute, deciduous. *Flowers* sessile, whitish in axillary sessile clustered cymes. *Bracts* conspicuous, outer bracts ovate-lanceolate, exceeding the flowers. *Calyx* hirsute, linear. *Corolla-tube* hispid, yellowish. *Fruit* sub-globose, azure blue, up to ·25 in., 4 lobed; pyrenes 4-5.

KHASI & JAINTIA HILLS, CACHAR, NAGA HILLS, SYLHET. Flrs. 6-7. Fr. 9-11.

2. Lasianthus sikkimensis *Hook. f.*

A shrub; young parts tomentose. *Leaves* 4-8 by 1-2·25 in., narrow-lanceolate or elliptic-lanceolate, long acuminate, entire, coriaceous, glabrous above, tomentose beneath; lateral nerves 7-9 on either half, prominent beneath; base acute; petiole ·25-·5 in. long. *Flowers* white; bracts subulate. *Calyx-teeth* 5, narrow-lanceolate. *Corolla* ·7 in. long. *Drupe* light blue, about ·16 in. across, sub-globose, almost glabrous; pyrenes 5.

KHASI and JAINTIA HILLS (Brandis).
Digboi, LAKHIMPUR (Dipterocarp forests 14067).

3. Lasianthus Wallichii *Wight.*

An evergreen slender undershrub. *Branches*, petioles and underside of leaves generally rusty tomentose. *Leaves* 2-5 by 1-1·5 in., lanceolate, entire, cuspidate-acuminate, ciliate, chartaceous, glabrous and shining above; lateral nerves 6-7 on either half, much arched, secondary sub-parallel, irregularly transverse; base rounded, short, often unequal, short petioled; stipules linear-lanceolate. *Flowers* ·7 in. long, sessile, bracteate, axillary, fascicled; bracts linear, subulate. *Calyx* hirsute, lobes lanceolate-subulate. *Corolla-tube* slender, hairy; lobes spreading. *Fruit* "bright peacock blue, ·33 in. long, not quite so broad."—C. G. Rogers. *Pyrenes* 5 (Hooker), 4-6 (Haines).

SYLHET, Wallich ! ASSAM, Jenkins !
Flrs. 4.

4. Lasianthus tentaculatus *Hk. f.*

Shrubby, glabrous. *Leaves* inequilateral, 5-7 by 2-2·5 in., oblong or obovate-oblong, abruptly acuminate, membranous, shining above, minutely hairy beneath; lateral nerves about 9 on either half, base rounded or acute; petiole ·1 in. long, hispid; stipules hispid, lanceolate, subulate. *Flowers* sessile; bracts hispid, subulate or filiform, rigid. *Calyx* small, segments linear, hispid. *Corolla* tube ·6 in. long, narrow hispid. *Fruit* not known.

SYLHET (Wallich). (*F. B. I.* Vol. III. P. 181).

5. Lasianthus tubiferus *Hk. f.*

A shrub (up to 12 ft.); stem closely brown, felted. *Leaves* 4-6·5 by 1·2-2·5 in., elliptic or lanceolate, occasionally acuminate, undulate, subcoriaceous, rough with minute short hairs underneath; lateral nerves 5-6 on either half, tertiaries raised above, conspicuous, sub-parallel in the uppermost pair; base narrowed into the petiole; petiole ·3-·5 in. long. *Flowers* sessile, in axillary clusters. *Bracts* orbicular, about ·16 in. broad, shining inside. *Corolla-tube* longer than the calyx, throat villous. *Fruit* ·3-·5 in. long, brownish when ripe with yellow juice; pyrenes 5, yellow.

KHASI & JAINTIA HILLS, ascending up to 5,000 ft.
Flrs. 5-6. Fr. 11.

6. Lasianthus lucidus *Blume.*

An evergreen erect shrub up to 10 ft. *Branches* and branchlets green. *Bark* brown; blaze reddish. *Leaves* 2-farious, 2-5 by 1-1·7 in., elliptic-ovate or lanceolate, entire, caudate-acuminate, membranous, glabrous above, strigose along nerves beneath; lateral nerves 5-7 on either half, very oblique, arched; base acute or obtuse, occasionally oblique; stipules minute. *Flowers* white, ·3-·4 in. long, sessile or sub-sessile in axillary sessile cymes. *Calyx* cup-shaped as broad as long; teeth lanceolate. *Corolla* tubular, densely woolly inside, pubescent outside. *Fruit* torquoise blue, about ·25 in. across, crowned by the calyx-teeth; pyrenes 5 (4 Hooker).

DARRANG, LAKHIMPUR, SIBSAGAR, KHASI HILLS, ascending up to 6,000 ft.

Flrs. 3-5. Fr. Cold season.

7. Lasianthus Hookeri *Clarke.*

An erect shrub with horizontal branches; young parts minutely strigose. *Leaves* 3-8 by ·7-2 in., bifarious, elliptic to oblong-lanceolate, caudate-acuminate, margin ciliate, obscurely undulate, chartaceous, shining, glabrous above, strigose below, specially on the nerves; lateral nerves 5-7 on either half, very slanting, tertiaries strongly tarnsverse to the midrib; base acute; petiole ·2-·3 in. long. *Flowers* sessile, white, ebracteate in axillary clustered cymes. *Calyx* teeth lanceolate. *Corolla-tube* hairy. *Fruit* ·16 in. across, blue when ripe, crowned by the calyx-teeth; pyrenes 6.

KHASI & JAINTIA HILLS, up to 4,000 ft.

Flrs. 9-5. Fr. Cold season.

8. Lasianthus inconspicuus *Hk. f.*

Shrub, glabrous. *Leaves* 3·5-5 by 1·25-1·75 in., elliptic, caudate-acuminate, opaque above; lateral nerves 5-5 on either half, rather obscure above, more distinct beneath; base acute; petiole slender, ·25 in. long, puberulous; stipules small, triangular. *Flowers* in pubescent axillary clusters. *Calyx* glabrous; segments 5, triangular, acute. *Corolla-tube* slender, pubescent. *Drupe* globose, ·06 in. across, smooth, crowned by the calyx-teeth; pyrenes 4-5.

SYLHET (Wallich). (*F. B. I.* Vol. III. P. 187).

9. Lasianthus lancifolius *Hk. f.*

A shrub (5 ft.). *Branches* green. *Petiole*, midrib and nerves grey-puberulous. *Leaves* 1·5-4 by ·5-1·3 in., lanceolate to narrow oblong-lanceolate, entire, long acuminate, membranous, glabrous and shining above; lateral nerves 3-5 on either half, arcuate, conspicuous; base acute; stipules narrowly triangular, villous. *Flowers* sessile, white, ebracteate in axillary clusters. *Calyx* teeth subulate or lanceolate, persistent, rather shorter than or as long as the tube, brown-pubescent. *Corolla-tube* peberulous, slender.

Fruit succulent, bright blue, crowned by calyx-teeth, ·25 in. across, pyrenes 5.

K. & J. HILLS.

Fr. 11.

10. Lasianthus longicauda *Hk. f.*

A small shrub; stem green, branches slender, green. *Leaves* 3-5 by ·8-1 in., lanceolate, very long caudate-acuminate, entire, membranous, glabrous, pale beneath; lateral nerves 8-11 on either half, slender, looped with shorter undulate ones, midrib prominent; base acute; petiole ·2-·3 in. long; stipules caducous. *Flowers* sessile, in shortly peduncled axillary panicled cymes. *Calyx* minute, puberulous. *Corolla* glabrous. *Fruit* turquoise blue, ·25 in. across, pyrenes 4.

MISHMI HILLS, KHASI HILLS up to 5,600 ft.

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

11. Lasianthus Biermanni *King.*

A bush (8-10 ft.) with horizontal branches. *Leaves* 4-6 by 1-2 in., elliptic or lanceolate, caudate-acuminate, entire, subcoriaceous, strigose on petiole and nerves beneath; lateral nerves 5-7 on either half, tertiaries parallel, more or less transverse; petiole ·2-1 in. long. *Flowers* dull blue in axillary peduncled cymes pointed downwards and forwards ·6-·7 in. long. *Calyx* tube obconic, strigose outside; teeth triangular or broadly lanceolate. *Corolla* trumpet-shaped, glabrous outside. *Fruit* metallic blue, sub-globose, ·5 in. across; pyrenes 6.

KHASI HILLS, up to 6,000 ft.

Flrs. 4-6. Fr. 12-2.

42. BORRERIA G. F. W. Mey.

Borreria hispida *K. Schum.* Syn. Spermacoce hispida Linn.

A procumbent scabrid, hirsute or hispid herb with often perennial roots. *Branches* stout, 4-angled. *Leaves* ·5-1·5

by ·3-·6 in., obovate, spathulate, oblong or elliptic, obtuse or acute, scabrid above. *Flowers* whorled. *Corolla* blue or white. *Capsule* hispid or pubescent.

ASSAM (F. B. I.).

Roots possess properties similar to Sarsaparilla. *Seeds* have been recommended as a substitute for coffee.

Flrs. 7-10. Fr. 9-12.

43. RUBIA Linn.

Rubia cordifolia *Linn.* The Indian Madder. *Manjistha,* Sans.; *Soh-misem,* Khasi.

A climbing herb with perennial rootstock, stem scabrid, aculeate, 4-gonous. *Leaves* whorled, 1-3 by ·5-1·5 in., ovate, lanceolate, acuminate, margins minutely prickly, thinly coriaceous, hispid above, scabrous on the nerves beneath; lateral nerves 5-7 on either half; base rounded or cordate; petiole up to 2·5 in. long, triangular with hooked prickles. *Flowers* usually 5-merous, yellowish in terminal umbellate panicled cymes, branches trichotomous. *Calyx-tube* small, globose; limb obsolete. *Corolla* hispid, greenish with racemed petals, divided nearly to the base. *Stamens* adnate to the corolla tube; anthers oblong, exserted. *Ovary* 2-celled; ovules solitary in each cell, attached to the septum; style 2; stigma globose, exserted. *Fruit* globose, purplish-black when ripe with a purple juice inside, ·12-·17 in. across, didymous, broad, albumen horny; radicle slender, inferior.

KHASI HILLS.

Roots and stem give yellow and red dyes according to treatment with other ingredients. The plant has got medicinal properties according to Ayurvedic and Hakimee Pharmacopæa.

Flrs. 8-9. Fr. Cold season.

Rubia sikkimensis *Kurz.* obtainable from Mishmi Hills. (No specimens in Shillong Herbarium). Yields dye staff similar to *R. cordifolia.*

44. GALIUM Linn.

Galium rotundifolium *Linn.*

A perennial scandent diffuse herb; branchlets 4-gonous. *Leaves* whorled, ·4-1 by ·2-·4 in., sessile or sub-sessile,

ovate or elliptic, acute, mucronate or obtuse, subcoriaceous, hispid with 3 prominent basal nerves. *Flowers* minute, usually tetramerous, in terminal cymes; branches very slender. *Corolla* white or yellowish; lobes valvate. *Stamens* on the corolla tube; filaments short; anthers didymous. *Ovary* 2-celled; style short with 2 arms; stigma capitate. *Fruit* dry, small, hispid with hooked hairs. *Seeds* adhering to the pericarp, plano-convex, ventrally grooved; testa membranous; radicle inferior, elongate.

KHASI HILLS.

Flrs. 7.

Galium Mollugo *Linn.*—also occurs in KHASI HILLS (nerves obscure, 3-nerved from the base).

Richardsonia pilosa *H. B. & K.*

A puberulous herb. *Leaves* 1·1·5 by ·4-·8 in., elliptic, acute, membranous; base acute or cuneate; stipules divided. *Corolla* valvate. *Ovules* 1 in each cell, ascending; micropyle facing downwards.

An American plant now wild in Shillong.

Flrs. & Fr. Rainy season.

FAM. 72. VALERIANACEÆ.

Usually herbs, annual or perennial, branching distichous. *Leaves* opposite, exstipulate (but the petioles are often united at the base by a rim,) entire, pinnatifid or pinnate. *Flowers* polygamous or diœcious, assymmetric, usually pentamerous, generally sessile in cymose panicles, bracteate. *Calyx* adnate to the ovary, little developed at the time of flowering, afterwards often forming a pappus. *Corolla* lobes usually 5 (3-5), imbricate in bud, gibbous, spurred at the base. *Stamens* 1-4, epipetalous, alternating with the corolla lobes; anthers introrse. *Ovary* inferior, 3 locular, only 1 cell is fertile containing one pendulous anatropous ovule; style filiform. *Fruit* dry, indehiscent, 1-seeded, crowned with the calyx limb. *Seeds* usually exalbuminous; embryo straight; cotyledons flat; radicle superior.

The Indian Nard (*Jatamansi*, Sans.), .Nardostachys Jatamansi *DC.*, which is a perennial herb of economic importance inhabiting the Alpine Himalayas (11,000-15,000 ft.) belongs to this family.

VALERIANA Linn.

Perennial herb. *Leaves* entire or pinnatifid. *Flowers* in corymbosely panicled cymes; bracts small. *Calyx-limb* involute in flower, afterwards forming deciduous plumose bristly pappus. *Corolla* funnel-shaped, sometimes gibbous at base; lobes 5. *Stamens* 3. *Ovary* 3-celled, 1-ovuled; stigma 2-3 fid or subentire. *Fruit* oblong, compressed, with 3 dorsal and 1 ventral rib, crowned with the pappus.

Stem 1-5 ft., pubescent below. Root-stock hardly thickened. Leaves pinnate; leaflets 3-7 pairs. Radicle undivided, disappearing at fruiting time. Fruit hairy.	1. *V. Hardwickii.*
Stem not more than 18 ft., pubescent. Root-stock thick, horizontal. Leaves entire or pinnate. Radicle usually toothed. Fruit hairy or nearly glabrous.	2. *V. Wallichii.*

1. Valeriana Hardwickii *Wall.*

Pubescent below. *Stem* 1-5 ft. *Root-stock* hardly thickened, descending, fibrous. *Radical* leaves few, usually undivided, long petioled, disappearing before fruiting time, 2-3·9 by 1·5-3 in., ovate-acute. *Cauline* leaves pinnate, 3-6 in.; leaflets 3-7, lanceolate, usually entire, acuminate, the terminal one longest. *Flowers* reddish. *Inflorescence* lax in fruit. *Bracteoles* shorter than the fruit. *Fruit* hairy.

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

The root is used sometimes for medicine but mainly as a perfume. There is little doubt that it may prove an efficient substitute for "Valerian" (Dymock).

Flrs. 8-10. Fr. 11-12.

2. Valeriana Wallichii *DC.* Vern. *Jatung*, Khasi.

Pubescent. *Stem* 6-18 in. *Root-stock* aromatic, thick, horizontal with thick descending fibres. *Radicle* leaves persistent, long petioled, 1-3 in. diameter, deeply cordate or cordate-ovate usually toothed and acute. *Cauline* leaves shorter petioled, smaller and fewer, entire or pinnate. *Inflorescence* not very lax even in fruit. *Fruit* hairy or glabrous.

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

The roots are used in every way similar to *V. Hardwickii.*

Flrs. 4-5. Fr. 5-7.

Patrinia speciosa *Haud-Mazz* K. B. 1934 (no specimen in Forest herbarium).

FAM. 73. DIPSACEÆ.

Perennial herbs, rarely shrubs. *Leaves* opposite, exstipulate, sometimes connate at the base (Dipsacus) entire, toothed or pinnate. *Flowers* in cymose whorls or in dense heads surrounded by bracts; bracteoles often conspicuous. *Calyx-tube* adnate to the ovary, usually constricted above it; limb cup-shaped, bristly. *Corolla* funnel-shaped; limb 2-5 lobed, equal or bilabiate, imbricate. *Stamens* usually 4, epipetalous. *Ovary* 1-loc; ovule one, pendulous, anatropous; style filiform; stigma capitate or linear, terminal or lateral. *Fruit* an achene enveloped in an epicalyx. *Seed* albuminous; embryo straight; radicle superior.

Dipsacus asper *Wall.*

A stout erect prickly perennial herb. *Leaves* 4-8 by ·6-3·5 in., connate at the base, pinnately lobed, hairy above, nearly bristly on the nerves beneath; lobes toothed, pilose above, scabrous beneath. *Flowers* white, in cymose sub-globose heads; bracteoles obovate-lanceolate, ciliate.

KHASI HILLS, up to 6,000 ft.

Flrs. 9. Fr. 11.

Dipsacus inermis *Wall.* Unarmed Teasal.

An erect herb. *Leaves* pinnatifid, hairy on both surfaces. *Calyx* segments subquadrangular, hairy, deciduous. *Corolla* tube funnel-shaped. *Fruit* 8-ribbed.

Closely resembles D. asper *Wall.*

ASSAM, (Kew Bulletin 1930).

Flrs. 7-8.

Morina betonicoides *Benth.*

A perennial spiny herb. *Stem* 6-18 in. long. *Leaves* about 4 in. long, spiny. *Corolla* pale-purple. *Calyx* segments herbaceous, bilabiate. *Fertile stamens* 4, sub-equal. *Achene* free in the base of the involucel.

(Kew Bulletin 1934).

FAM. 74. COMPOSITÆ

Herbs or shrubs, rarely trees. *Leaves* alternate, rarely opposite, simple or compound; base of leaf or petiole sometimes sheathing, exstipulate. *Flowers* sessile, in a dense head on the enlarged end of the axis of various shapes (flat, straight, convex or even spindle shaped); common receptacle enclosed in an involucre of whorled calyx-like bracts; bracteoles 0 or reduced to paleate scales or bristles, pentamerous, all tubular (discoid) or the outer or all ligulate, all bisexual or the inner bisexual or male, the outer female or neuter, sometimes monœcious or diœcious. *Calyx* superior, rarely absent, sometimes a 5-lobed rim at the top of the ovary, usually it takes the form of hairs or bristles (pappus) and enlarges after fertilization into a parachute or hooked bristles. *Corolla* actinomorphic (tubular) or zygomorphic; of the latter there are two forms, labiate and ligulate; lobes usually 5, valvate. *Disc* epigynous. *Stamens* usually 5, epipetalous; filaments short, free; anthers introrse usually cohering by their edges. *Ovary* 1-loc; style simple, forking at end into 2 stigmas; there is often a brush of hairs on the style below the stigmas; ovules solitary, erect, anatropous. *Fruit* (cypsela) dry, indehiscent. *Seeds* exalbuminous; embryo straight; cotyledons plano-convex; radicle short.

This family is very extensively represented in Assam, but many herbaceous plants have been omitted.

I. Flowers (disc) not ligulate, no latex :—

i. Heads homogamous; flowers never yellow; anthers arrow-shaped at base, rarely sub-cordate; style arm subulate, hairy; leaves usually alternate :—

Heads distinct, usually many flowered; pappus long, copious; leaves cauline. .. .. **1. Vernonia.**

Heads 1 or few flowered crowded into dense bracteate clusters; pappus chaffy; leaves chiefly radical. .. .. .. **2. Elephantopus.**

ii. Heads homogamous; flowers never pure yellow; anthers blunt at base; style-arms usually elongate-obtuse, minutely papillose; pappus usually setose. Leaves alternate or opposite:—
Invol. bracts many achenes 5-angled. .. .. .. **3. Eupatorium.**

iii. Heads heterogamous rayed or discoid or homogamous rayless; anther base blunt; style-arms flattened or plano-convex; leaves usually alternate :—
Flowers all yellow, ray ligulate; heads in scorpioid cymes; pappus 1-2 seriate, slender, scabrid. .. **4. Solidago.**
Ray flowers slender, tubular or with very short ligule; disc flowers yellow. Heads very small, pappus long, copious. .. .. **5. Microglossa.**

iv. Heads heterogamous rayed or discoid or homogamous and rayless; anther base tailed; style various; flowers ray and disc) usually yellow; leaves alternate :—
Heads corymbose, panicled or fascicled :—
Pappus 1-seriate, caducous, bracts narrow; usually aromatic herb. .. .. **6. Blumea.**
Heads in dense globose or ovoid clusters :—
Pappus 0; bracts paleacious; herb with winged stem. .. **7. Sphæ ranthus.**
Heads corymbose or fascicled; bracts scarious usually hyaline :—
Pappus slender, scabrous, caducous; common weed. .. **8. Anaphalis.**
Heads solitary, corymbose or panicled, rayed. Bracts many seriate; outer herbaceous; outer most often foliaceous :—
Pappus short, 1-2 seriate, subequal, scabrid or bearded. .. **9. Inula.**

v. Heads heterogamous, usually rayed or homogamous rayless. Receptacle paleaceous. Flowers usually yellow. Anther base not tailed. Style-arms truncate or appendiculate, or of sterile flower entire :—
Heads monœcious axillary apeta-

lous. Anther nearly free, inflexed Achenes armed with glochidiate spines Pappus 0. Leaves alternate. .. .. .. **10. Xanthium.**

Heads heterogamous or homogamous. Flowers hermaphrodite, all fertile. Leaves usually opposite:—

Inner invol.-bracts embracing the achenes. Outer invol.-bracts 5-glandular. .. **11. Siegesbeckia.**

Inner invol.-bracts not embracing the achenes:—

Palea of receptacle flat. Flowers white. .. **12. Eclipta.**

Palea of receptacle concave embracing the achenes. Flowers yellowish. **13. Spilanthes.**

vi. Heads heterogamous, rayed or discoid or homogamous, rayless; leaves usually alternate:—

a. Invol.-bracts 2-many seriate. Receptacle naked. Anthers usually rounded at base (not tailed) style-arms truncate. Pappus 0:—

Heads small, disciform, racemose or panicled. Corolla of hermaphrodite flowers 5-fid. Large herbs. .. .. **14. Artemisia.**

b. Invol.-bracts usually 1-seriate and sub-equal. Receptacle usually naked. Anther base obtuse, rarely tailed. Style-arms of hermaphrodite flowers truncate or obtuse, penicillate or with hairy tips:—

Heads homogamous, ebracteolate, discoid. Style-arms usually appendiculate. Flowers purple or red. .. .. **15. Emilia.**

Heads heterogamous, rayed (rarely homogamous and rayless). Style-arms truncate. Flowers yellow. .. .. **16. Senecio.**

vii. Heads homogamous or rarely heterogamous. Flowers all tubular. Invol.-

bracts many seriate. Corolla-tube deeply 5-lobed. Anther cells tailed; styles subentire or arms short, hairy or thickened towards the base. Heads many flowered, separate :—

Filaments papillose-hairy. Pappus hairy, feathery. .. .. **17. Crisium.**

Filaments hairy in the middle. Pappus paleaceous or 0. .. **18. Carthamus.**

viii. Heads heterogamous or homogamous rayed or not. Corolla all tubular; lobes narrow, ligulate, equal or obscurely bilabiate. Involucral-bracts many seriate. Anther cells sagittate, tails ciliate. Style-arms not appendaged:—

Pappus hairs simple. Leaves alternate. Shrub. .. .. **19. Leucomeris.**

Flowers all ligulate, latex. Heads homogamous, ligules truncate, 5-toothed. Anther base sagittate, rarely tailed. Style-arms slender:—

Heads simple; achenes long beaked; scapigerous milky herb. .. .. .. **20. Taraxacum.**

Heads irregularly subcorymbose, umbellate or panicled; achenes not beaked; milky herb. .. .. .. **21. Sonchus.**

1. VERNONIA Schreb.

Herbs, undershrubs, shrubs or small trees or climbers. *Leaves* alternate, often toothed. *Heads* terminal or axillary, homogamous, solitary or in panicled cymes. *Involucre* ovoid, globose or hemispheric; bracts many seriate, inner longest. *Receptacle* naked or pitted, sometimes hairy. *Flowers* usually purple, all tubular. *Corollas* all equal; lobes 5, narrow. *Anthers* obtusely auricled at base. *Style-arms* subulate, puberulous. *Fruit* striate, ribbed, angled or truncate. *Pappus* usually in 2 rows; the outer simple, shorter, bristly or paleaceous; the inner longer and plumose.

Erect :—

Involucral-bracts all or outermost subulate or lanceolate, often aristate :—

Heads large 1 in. across or more, few :—

Heads 30-40 flowered. Pappus reddish. A stout undershrub. .. *1. V. subsessilis.*

Heads small, ·25 in. across or less :—
Heads about 20 flowered. Pappus white or dirty white. Herbaceous perennial, hoary-pubescent. .. 2. *V. cinerea.*
Heads about 8-12 flowered; achenes ribbed. Shrubby, hairy. 3. *V. divergens.*
Invol.-bracts all obtuse or apiculate, usually linear or oblong :—
Outer invol.-bracts larger than the inner with leafy tip :—
A robust leafy annual. .. .. 4. *V. anthelmintica.*
Outer invol.-bracts much shorter than the inner :—
Trees or shrubs :—
Heads usually large :—
Achenes obscurely 10 ribbed, glabrous. Head 1-6 flowered, pappus white or yellowish. .. 5. *V. arborea.*
Achenes 10 ribbed, glabrous. Heads 3-10 flowered. Pappus whitish. .. .. .. 6. *V. volkameriæfolia.*
Achenes 10 ribbed, glabrous. Heads 8-20 flowered. Pappus reddish. .. .. .. 7. *V. talaumifolia.*
Achenes costate hairy. Heads 20 flowered. Pappus white. .. 8. *V. Parryae.*
Climbing :—
Heads 5-10 flowered. Pappus red. .. 9. *V. scandens.*

1. Vernonia subsessilis *DC.*

A stout undershrub growing among rock under shade. *Leaves* 2-7·5 by ·3-1·5 in., narrowly lanceolate or oblanceolate, acute or acuminate, obscurely or distantly toothed or sinuate, chartaceous, glabrescent above, pubescent beneath; lateral nerves 7-10 on either half, slender, inconspicuous above, more or less pubescent beneath; base narrowed into the petiole, often emarginate; petiole 0-·2 in. long. *Inflorescence* in corymbose heads; peduncles pubescent; bracts foliaceous, linear-oblong. *Heads* about 40-flowered; invol-bracts subulate, pubescent, often recurved. *Flowers* purple, fading white, *Corolla* glabrous. *Fruit* ribbed. *Pappus* reddish, unequal, persistent.

KHASI HILLS, ascending up to 2,000 ft.

Flrs. 10-11. Fr. 12.

2. Vernonia cinerea *Less.*—Almost a perennial herb and one of the most common weed occurs throughout the area.

This plant is also used in Hindu medicine (febrile affections, piles, conjunctivitis, etc.).

Flrs. 7-8. Fr. 11-12.

3. Vernonia divergens *Benth.*

A shrub or undershrub, rusty pubescent throughout. *Leaves* very variable, 5-6 by ·5-3 in., elliptic, rhomboid or lanceolate, usually serrate; lateral nerves 5-10 on either half, arched; base cuneate; petiole short. *Flowers* pale blue in terminal ·corymbosely panicled cymes. *Pollen* grain hexagonally reticulate. *Pappus* brown or whitish.

ASSAM, MANIPUR (Brandis).

Flrs & Frs. Cold season.

4. Vernonia anthelmintica *Willd.* Vern. *Kalazira,* Beng.; *Somaraji,* Sanskrit.

A robust coarse pubescent annual. *Leaves* 3-8 in., elliptic, lanceolate or ovate-lanceolate, coarsely serrate. *Heads* purple, ·6-·7 in., several together in each peduncle, often subcorymbose. *Involucral-bracts* linear-oblong, apiculate, scarious below. *Fruit* ·15 in. long, truncate, black, hairy. *Pappus* reddish or dirty, outer row paleaceous.

Common weed near villages.

In Hindu medicine the seeds are of great repute as a medicine for various diseases. The juice of the leaves is also given to cure phlegmatic discharges from the nose.

Flrs. 9-12. Fr. Cold season.

5. Vernonia arborea *Ham.* Vern. *Mas-koita,* Ass.; *Pachet,* Naga; *Semkhari-phang,* Kach.

A deciduous tree (95′/59″) with spreading crown, often buttressed; branchlets pubescent. *Bark* grey, corky, having vertical fissure; blaze creamy, turning yellowish black (wood whitish or cream coloured no heart wood). *Leaves* 1·5-9·5 by ·5-4 in., elliptic, elliptic-oblong or elliptic-ovate, entire or sinuate, acute or acuminate, coriaceous, glabrous,

somewhat harsh above, glabrescent or pubescent beneath; lateral nerves 12-15 on either half, quite prominent beneath; petiole ·3-1·3 in. long. *Flowers* whitish or pale blue, in large terminal ferruginously pubescent panicled heads. *Head* 1-6 flowered; invol. small; bracts oblong, concave, obtuse. *Fruit* obscurely ribbed; pappus white, 1-seriate, equal.

SYLHET, CACHAR, KHASI HILLS, N. C. HILLS, LAKHIMPUR & SIBSAGAR.

Bark is chewed by Nagas as a substitute for *Pan.*

Flrs 2-3. Fr. 11.

6. Vernonia volkameriæfolia *DC.* Vern. *Dieng-duma, Dieng-soh-iksarlaupa,* Khasi; *Dieng-la-iar, Dieng-duma-blai,* Synt.

A large shrub or middle sized tree; young shoots and leaves rusty pubescent. *Bark* greyish brown, rather closely reticulately split, deep green underneath corky layer; inside greenish white, soon turning dirty green. *Leaves* 3·5-12 by ·8-4·4 in., oblanceolate or oblong-obovate, entire, repand or coarsely dentate, acute, subcoriaceous, puberulous; midrib stout; lateral nerves 8-10 on either half; base cuneate; petiole stout with a decurrent base for half the circumference of the branchlet. *Flowers* in large terminal cymosely panicled heads; invol.-bracts more or less hairy, oblong, with obtuse or rounded ends. *Petals* strap-shaped, ribbed, recurved, purplish. *Fruit* ribbed and almost glabrous. *Pappus* whitish, or dirty white, filiform, persistent (·35 in.); few outside unequal.

MISHMI HILLS (Griffith), KHASI & JAINTIA HILLS, ascending up to 5,000 ft.

Flrs. 12-1. Fr. 3-4.

7. Vernonia talaumifolia *Hook. f.* Vern. *To-thueng,* Synt.

A small or middle sized tree (25′/21″), trunk generally notched. *Bark* brown; blaze blackish; wood white. *Leaves* 10-20 by 1-3 in., obovate or oblanceolate, bluntly acute or mucronate, entire or sinuate, coriaceous, glabrous above, slightly hairy on the midrib beneath; base narrowed into

a short petiole, ·5 in. long. *Inflorescence* large, much branched; invol.-bracts almost glabrous, ovate. *Pappus* red.

KHASI HILLS, NAGA HILLS, up to 2,500 ft.

Flrs. 10-12. Fr. 1-3.

V. talaumifolia *Hk. f.* Var. hirsutior *C.E.C. Fischer* (Kew Bull. 1935).

8. Vernonia Parryae *Fischer.*

An undershrub. *Branches* thin, sulcate, fulvous pubescent towards the upper end. *Leaves* 4-8 by ·5-1 ·2 in., elliptic, somewhat linear, often falcate, acuminate, remotely, minutely, dentately smooth; lateral nerves 7 on either half; reticulation more prominent beneath; base narrowed into the petiole; petiole ·12-·4 in. long. *Inflorescence* cymose, axillary; bracts linear, ·4-1 in. long, resembling floral-leaf, fulvous pubescent towards the base; pedicels fulvous pubescent. *Head* ·5 in. diameter of 20 florets; invol.-bracts numerous, pilose outside, glabrous inside; margin scarious. *Receptacles* glabrous. *Corolla* purple, ·3-·4 in. long. *Achene* thin, costate with white hairs, ·1 in. long; *Pappus* white, erect, barbellate, ·3 in. long.

LUSHAI HILLS (Bharbuk-Mrs. N. E. Perry—January/32, 507).

9. Vernonia scandens *DC.*

A rambling woody climber; young parts slightly pubescent. *Bark* yellowish thin; blaze green, turning blackish yellow. *Leaves* ·8-7 by ·5-3·5 in., elliptic to ovate-lanceolate, entire, sharply acuminate, membranous, more or less puberulous on both surfaces, paler beneath; lateral nerves about 5 on either half, arcuate; base narrowed into the petiole; petiole slender, up to ·3 in. long. *Flowers* in long terminal leafy panicled 5-10 flowered heads; invol.-bracts in several rows, ciliate, ovate or linear-lanceolate, acute or obtuse, scarious. *Fruit* glabrous, ribbed; pappus reddish up to ·3 in. long.

LAKHIMPUR, SIBSAGAR, GARO HILLS, (SYLHET—Hook. f. T), KHASI & JAINTIA HILLS ascending up to 5,000 ft.

Flrs. 12-1. Frs. 3.

Vernonia Mastersii *Watt*—A shrub. *Bark* greyish, ·16 in. thick, granular, slightly vertically split; blaze greenish white with black streaks, turning blackish. *Leaves* 5-8 by 2-3 in., ovate-oblong, acute or acuminate, coriaceous, glabrous above, tomentose beneath; lateral nerves 10-12 on either half, impressed above, prominent beneath; base rounded; petiole 1-1·5 in. long. *Inflorescence* pubescent. *Head* 16-20 flowered; invol.-bracts ovate, concave, pubescent outside. *Achenes* glabrous, subcylindric, ·1 in. long, glabrous, obscurely 4 angled; pappus reddish.

NAGA HILLS, KHASI HILLS, SIBSAGAR.

Flrs. Cold season. Fr. Hot season.

Vernonia bracteata *Wall.*

A rigid shrubby plant, scaberulous; branches terete. *Leaves* 1·5-4 by ·5-1·2 in., elliptic or elliptic-lanceolate, acute, distantly denticulate-serrate. *Capitulum* many flowered; bracts linear-oblong; achenes glabrous. *Pappus* pinkish.

KHASI and JAINTIA HILLS, up to 6,000 ft.

Flrs. 8. Fr. 4 (following year).

Vernonia blanda *DC.*

A rambling shrub. *Leaves* elliptic, acuminate, entire, glabrous; base cuneate. *Panicles* puberulous; heads 10-25 flowered. *Achenes* 10-ribbed, pubescent; pappus red.

NAGA HILLS.

2. ELEPHANTOPUS Linn.

Elephantopus scaber *Linn.* Vern. *Kombat-skur-sniang,* Khasi.

A stiff scabrous herb, dichotomously branched. *Radical leaves* oblanceolate, obovate-lanceolate, cuneate; amplexicaul leaves attenuate, sessile, 1-3 by ·5-1 in. *Heads* homogamous, 2-5 flowered in dense cluster, each cluster being supported by usually 3 cordate rigid ovate foliaceous bracts (about 8), which are dry, flat or conduplicate. *Corolla* purplish; limb 4-5 toothed. *Style-arms* subulate. *Fruit* truncate, ·15 in. long, brown, ribbed, hairy; pappus of 5 bristles, dilated at base.

KHASI & JAINTIA HILLS.

The embryo not unfrequently germinates in the head. (Hooker-F. B. I.).

A decoction of the root and leaves is given in cases of dysuria. A preparation from the root is given in fever. Boiled bruised leaves

with rice is given for swelling or pains in the stomach (Indian Medicinal Plants).

Flrs. 10. Fr. Cold season.

3. EUPATORIUM Linn.

Eupatorium cannabinum *Linn.* Vern. *Samsing, Dura-summok,* Garo; *Tongol-lati,* Ass.; *Sam-khabli,* Kach.; *Long-renchick,* Kuki; *Kombat-nong-rim,* Khasi; *Kal-bun,* Mik.

A coarse perennial, often straggling. *Leaves* ·8-4·5 by ·3-2·5 in., usually opposite, sometimes alternate, lanceolate, ovate-lanceolate, coarsely serrate, acuminate, scabrid above, pubescent beneath; lateral nerves almost obscure; base narrowed into the petiole; petiole up to ·7 in. long. *Flower* heads corymbose, homogamous. *Invol.-bracts* oblong, many seriate, unequal, ribbed or channelled; outer ones shorter; receptacle naked. *Corolla* regular, tubular, 5-lobed. *Stamens* syngenesious; anther appendaged. *Style-arms* long, obtuse. *Fruit* truncate, black with 5 ridges. *Pappus* white, filiform, 1-seriate, numerous, rigid, about twice the length of the fruit.

DARRANG, KAMRUP, GARO HILLS, N. C. HILLS & K. & J. HILLS.

Recommended as a deobstruent in visceral obstruction consequent to intermittent fevers and externally as a discutient in hydrophic swellings of the legs and scrotum (Fleming).

Flrs. 11-12. Fr. Cold season.

A pernicious invasive pest which has practically spread all over the province. Interferes with natural regeneration of timber trees and is a great menace to plantation.

Other species of the genus which occur in the area are E. burmanicum *DC.;* E. odoratum *Linn.* & E. Wallichii *DC.**

4. SOLIDAGO Linn.

Solidago Virga-aurea *Linn.* Golden rod.

An erect perennial glabrous or pubescent herb; stem stout, sub-simple, 6-24 in. high. *Leaves* ·8-5 by ·2-1·3 in., attenuate, lanceolate, acute or acuminate, lower ones

* E. odoratum is a very widely scattered pest found everywhere in Assam—R. N. De.

petiolate, distantly serrate, upper ones smaller, almost entire, sub-sessile. *Heads* 1-4 on short axillary peduncles, collected in a long leafy panicle. *Ray-flower* 1-seriate, about 8; female flowers ligulate; disk-flowers tubular. *Invol.-bracts* unequal, coriaceous, many seriate, narrow-acute. *Receptacle* naked. *Anther* bases obtuse. *Style-arms* of hermaphrodite flowers flattened. *Fruit* glabrous or puberulous.

KHASI HILLS, ascending up to 5,000 ft

Known as wound wort in English. Used very successfully in cases of dropsy; also efficacious in case of œdima when the dried powdered plant is administered with beaten eggs. (I. M. Plant).

Flrs. 11. Fr. Cold season.

Solidago nemoralis *Ait.*

Shrubby. *Leaves* 1-3·5 in., alternate, narrow, lanceolate, acuminate, remotely serrate; upper ones smaller, almost entire. *Scorpioid* cymes 2-3·5 in long.

Shillong (Cultivated) 5,000 ft.

Erigeron asteroides *Roxb.* Vern. *Bonoria-kopat, Bon.* Ass.

A coarse villous erect annual up to 2 ft. high, much branched. *Cauline* leaves numerous, amplexicaul, oblong or obovate, toothed or lobulate. *Radical* leaves obovate, coarsely toothed, petiolulate. *Heads* about ·25 in. across, usually in few flowered, terminal corymbs; involucre bracts 1-3, serrate. *Ligules* blue; disc florets tubular, yellow *Cypsela* comprises ·03 in., almost glabrous; pappus dirty, white or brownish.

SIBSAGAR, 200 ft.

Flrs. & Fr. 4-10.

5. MICROGLOSSA DC.

Microglossa volubilis *DC.* M. pyrifolia (Lam) O. Ktze.

A rambling shrub 10 ft. high; branches ribbed. *Leaves* 1-3 by ·3-1·5 in., ovate-elliptic, entire or distantly serrate, acuminate, very thinly chartaceous, glabrous above, finely pubescent beneath; lateral nerves 5-7 on either half, slender, arched and branched; secondary reticulate; base acute; petiole ·3-·5 in. long; *Heads* yellow, heterogamous, peduncled, clustered on the branches of corymbs. *Ray-flower*-female 1-many seriate, fertile; disk-flower-male often sterile. *Involucre* campanulate; bracts many seriate, lanceolate, unequal, outer

short, margin scarious. *Receptacle* flat, wider or slightly fimbriate. *Corolla* of ligulate flowers with bifid whitish ligule; anther-base obtuse, entire. *Disk* flowers tubular campanulate, 5 lobed; anther-base obtuse. *Fruit* minute, tetragonous, more or less compressed. *Pappus* soft, fine, silky, reddish.

MANIPUR, NAGA HILLS, SIBSAGAR, KHASI & JAINTIA HILLS.

Flrs. & Fr. Cold season.

Microglossa albescens *C. B. C.*

A stout shrub; branchlets obscurely grooved. *Leaves* 3-4·5 by ·75-1 in., narrow, lanceolate, acuminate, entire or distantly seriate, glabrous, whitish beneath; lateral nerves fine; base narrowed with a short petiole, ·1-·2 in. long. *Flower* heads ·3 in. across arranged in peduncle laxly clustered spreading corymbs. *Achene* obscurely 5-angled; pappus reddish.

NAGA HILLS, (No. 15,628, up to 10,000 ft.)

Flrs. 9. Fr. later.

6. BLUMEA DC.

Annual or perennial herbs, undershrubs or occasionally shrubs, glandular pubescent, woolly or glabrous, usually aromatic. *Leaves* alternate, usually toothed or lobed. *Heads* not rayed, heterogamous, corymbose, panicled or fascicled, rarely racemose. *Involucre* ovoid or campanulate; bracts many seriate, imbricate, soft or herbaceous, the outer smaller. *Receptacle* flat, naked or pubescent. *Flowers* yellowish, rarely purple or white, the outer flowers female, many seriate, the inner male, few, fertile. *Corolla* of female flowers filiform, minutely 2-3 toothed; of male flowers tubular, slender, 5-lobed. *Anther-base* sagittate with small tails. *Style* finally exserted, filiform or linear, subulate, minutely papillose. *Fruit* small, terete, angled or ribbed. *Pappus* scanty, 1-seriate, often caducous.

Heads many, villous, ·3 in. across :—
  Pappus white. Erect herbs. Leaves toothed or serrate. Achenes subtetragonous. .. *1. B. lacera.*

Heads very numerous, large or small :—
  Pappus white :—
    Scrambling or scandent shrub. Corolla lobes hairy. Achenes 10 ribbed, hairy. .. .. *2. B. chinensis.*

Leaves papery, oblanceolate-acuminate, glabrous; corolla lobes glabrous or glandular. Shrub; branches stout, glabrous or puberulous; petiole often appendaged.	3.	*B. myriocephala.*
Leaves elliptic-lanceolate, usually pinnatifid or woolly, deeply toothed, white, felted beneath. Corolla lobes hairy. A herb. Petiole marginate or winged.	4.	*B. densiflora.*
Leaves coriaceous, elliptic or oblanceolate, silky woolly. Small tree; branches stout, silkily woolly or villous. Petiole auricled.	5.	*B. balsamifera.*
Leaves membranous, villous or pubescent beneath. A straggling aromatic plant, rather shrubby. Petiole winged.	6.	*B. aromatica.*

1. Blumea lacera *DC.*

A coarse or slender very variable herb, villous or glandular, rarely glabrescent with a strong camphor or turpentine smell. *Leaves* 1-6 by ·5-2 in., obovate or elliptic-obovate, sharply, coarsely or doubly toothed, rarely lyrate or lobulate, obtuse, densely white, silky beneath; lateral nerves obscure; base narrowed into the petiole; petiole up to ·2 in. long. *Heads* small, up to ·3 in. across, arranged in axillary cymes or terminal panicles, sometimes corymbose. *Invol.-bracts* linear-acuminate, more or less hairy, margin scarious. *Receptacle* glabrous. *Corolla* yellow. *Fruit* grey-brown, sub-tetragonous, minutely pubescent or glabrescent. *Pappus* white.

SIBSAGAR, KHASI HILLS, up to 1,000 ft.

Mixed with black pepper it is given in cholera (Watt). Expressed juice of the leaves is a useful anthelmintic (specially in cases of thread-worm-Watt). "Highly thought of, by many Hospital Assistants as a febrifuge and astringent." It is a remedy in Turea Tarsi (I. M. Plants).

Flrs. Cold season. Frs. 4

2. Blumea chinensis *DC.*

A scrambling or scandent shrub; stem sulcate. *Leaves* 1-5 by ·4-1·5 in., ovate-oblong or lanceolate, acuminate,

distantly cuspidate-serrate, sub-coriaceous, glabrous; lateral nerves 5-6 on either half, arched, slender; base cuneate; petiole (and young stem) pubescent, ·1-·2 in. long. *Flowers* white. *Heads* clustered on the distant branches of a pubescent panicle. *Involucre-bracts* unequal, puberulous; outer short. *Receptacle* densely white, hairy; arms of style cylindrical. *Fruit* 10 ribbed. *Pappus* simple, scabrous.

SYLHET, MANIPUR, KHASI & JAINTIA HILLS, ascending up to 4,500 ft.

Flrs. 2-3 Fr. 4-5.

3. Blumea myriocephala *DC.*

A shrub; branches stout, thick, puberulous, ultimately glabrous. *Leaves* 3-10·5 by ·8-2·5 in., oblanceolate, acuminate, distantly serrulate, glabrous, coriaceous; lateral nerves numerous; base narrowed into a winged petiole; petiole ·2-1 in. long. *Head* up to ·3 in. across, clustered on an elongate tomentose erect panicle. *Invol.-bracts* tomentose. *Receptacle* more or less villous. *Corolla* lobes glabrous. *Fruit* ribbed, hairy. *Pappus* red.

LAKHIMPUR, SIBSAGAR, SYLHET (De Silva).

Flrs. 10-11. Fr. 2.

4. Blumea densiflora *DC.*

Herbs; stems stout. *Leaves* large, 6-14 by 1-2 in., elliptic-lanceolate, usually pinnatifid or irregularly and deeply toothed acute or obtuse, scaberulous above, white felted beneath; lateral nerves inconspicuous, midrib stout; base narrowed into a marginate or winged short petiole. *Inflorescence* tomentose or white felted, panicled, branched. *Invol.-bracts* narrow, rather rigid. *Receptacle* glabrescent. *Corolla* lobes of female flowers hairy. *Fruit* ribbed. *Pappus* red.

MISHMI HILLS, NAGA HILLS, SIBSAGAR, KHASI HILLS.

Camphor prepared from this plant was pronounced identical with that imported from China (Watt).

Flrs. & Fr. 12-2.

5. Blumea balsamifera *DC.*

A large short-lived aromatic shrub or small tree, gregarious on abandoned *jhums* (shifting cultivation); branches, leaves and inflorescence densely silky tomentose. *Leaves* 2-8·5 by ·5-2 in., elliptic or oblong-lanceolate, serrate, sometimes lobulate, acuminate, silky villous, membranous; base narrowed into the petiole; petiole up to ·1 in. long. *Flowers* heads small, up to ·3 in. across, sessile or shortly peduncled in clusters on the branches of a large spreading panicle. *Invol.-bracts* silky tomentose. *Receptacle* glabrous. *Fruit* ribbed. *Pappus* reddish.

GARO HILLS & KHASI HILLS, up to 4,000 ft.

Ai or Ngai camphor of S. W. China is distilled from this plant. A warm infusion acts as a pleasant sudorific and it is a useful expectorant as a decoction.

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

6. Blumea aromatica *DC.*

An aromatic undershrub attaining up to 10 ft. in height with glandular hairs. *Leaves* 2-16 by ·5-5 in. (those subtending the branches of inflorescence gradually narrower and smaller), oblanceolate or lanceolate, irregulary serrulate or rarely lobulate, membranous and flabby scabrous; lateral nerves 10-20 on either half; tertiaries irregularly reticulate; base narrowed into the petiole; petiole (lower leaves) often marginate, short, (upper) sessile. *Inflrescence* a large spreading panicle up to 16 in. in length. *Invol.-bracts* slender, puberulous. *Receptacle* glabrous. *Flowers* white, minutely pilose at the tips. *Corolla* lobes glandular. *Fruit* 10 ribbed, densely pilose. *Pappus* red.

NAGA HILLS, DUFFLA HILLS, KHASI & JAINTIA HILLS, up to 3,000 ft. (No specimen in the Forest herbarium)

Flrs. and Fr. Cold season.

Other herbaceous species of this genus recorded from the region of the flora are :—B. glomerata *DC.*, B. hieracifolia *DC.* B. Hookeri *Clarke*, B. oxyodonta *DC.**

* B. laciniata *DC.*, B. procera, *DC.*, B. squarrosa *DC.* also occur in Assam—R. N. DF

7. SPHÆRANTHUS Linn.

Sphæranthus indicus *Linn. Mundi, Munditika,* Sans.

Weed, very common on fallow lands about a foot high, stem cylindrical, glandular hairy; wings of stem toothed. *Leaves* alternate, decurrent on the stem, ·2-1·2 by ·1-·5 in., linear-oblong or obovate-oblong, toothed or serrate, glandular, acute or obtuse, villous. *Heads* small, heterogamous not rayed, collected together in a close terminal globose or ovoid compound involucre capitate cluster ·5-·6 in. across; peduncle winged, pubescent. *In each head* outer flowers are female, few or many, fertile, the central flowers bisexual, fertile or sterile. *Involucre* narrow; bracts paleaceous, spathulate, acute, ciliate. *Receptacle* small, naked. *Corolla* of female flowers slender, tubular, minutely 2-3 toothed; of hermaphrodite flowers tubular or funnel-shaped, 4-5 toothed. *Anther-base* sagittate, auricles acute or tailed. *Style-arms* filiform, sometimes connate. *Fruit* angular, sub-glabrous. *Pappus* absent.

KAMRUP, SYLHET, GOALPARA.

The seeds and the roots are considered to have anthelmintic properties. Powdered root is considered stomachic and the ground bark mixed with whey is a valuable for piles. It is also considered a powerful tonic deobstruent and alterative. In Punjab the flowers are highly esteemed as alterative, depurative, cooling and tonic, (I. M. Plants.)

Flrs. 2. Fr. 4.

8. ANAPHALIS DC.

Anaphalis cinnamomea *Clarke.*

A tall stout leafy perennial, rather shrubby; stem grey woolly or cinnamon coloured, leafy. *Leaves* alternate, sessile, 1·5-4 by ·4-·7 in., lanceolate, occasionally falcate, acuminate, entire, membranous, glabrescent, dark green above, usually cinnamon coloured and woolly beneath, usually 3-nerved, rarely more or less; base amplexicaul or auriculate. *Heads* ·3 in. across, numerous in terminal bracteate compound corymbs. *Invol.-bracts* many seriate, scarious, outermost short, woolly; inner petaloid. *Receptacle naked. Flowers* whitish. *Outer* flowers many, slender, fertile; corolla 2-4 lobed. *Inner* flowers usually sterile; corolla 5-lobed. *Fruit*

minute, oblong, glabrous. *Pappus* of female flowers slender, scabrid, caducous; of hermaphrodite flowers often thickened at the apex.

KHASI HILLS, ascending up to 5,000 ft.

Flrs. 9. Fr. 10-12.

Anaphalis triplinervis *C. B. C.*

A perennial woody herb. *Leaves* amplexicaul, 2-4 by ·75-1·2 in., elliptic-oblong, acute, whitish, woody beneath, usually 3-nerved. *Heads* corymbs; bracts whitish. *Achene* very small, oblong.

NAGA HILLS, (No. 15,634-10,000 ft.)

Flrs. 9. Fr. 11-12.

Gnaphalium purpureum *Linn.*

A rather stout woody or cottony herb. *Leaves* 1-2·5 (or more) by ·3-·5 in., spathulate or narrowly obovate, rounded or apiculate, woolly. *Heads* ·25 in across, usually in axillary globose cluster from the upper leaves (less often spicate); bracts acute or acuminate; inner linear-oblong, rounded. *Corolla* (bisexual); tip puberulous. *Cypsela* smooth or minutely papillose; pappus hairs markedly united at the base.

SIBSAGAR.

Flrs. & Fr 3-8.

G luteo-album *Linn.* Var. multiceps and G. hypoleucum *DC* are also recorded from the province.

9. INULA Linn.

Herbs or shrubs. *Leaves* alternate. *Heads* heterogamous, radiate or not, at the ends of branches, panicled, corymbose or solitary. *Outer flowers* female, 1-many seriate, fertile-yellow or white; central flowers hermaphrodite, yellow. *Involucre* usually hemispheric or campanulate; bracts many seriate, outer herbaceous, outermost often foliaceous. *Receptacle* flat, pitted, areolate or tumid. *Corolla* of fem. flrs. ligulate, 3-toothed; of herm. flrs. tubular, tube elongate, slightly wider upwards, 5 lobed. *Anther-base* sagittate with simple or branched tail. *Style-arm* of herm. flrs. linear-flattened, broader upwards, obtuse. *Fruit* usually ribbed, subterete. *Pappus* rather short, 1-2 seriate, smooth, scabrid or bearded.

Leaves cuspidate-serrate, woolly tomentose beneath; lateral nerves not very conspicuous. Receptacle pitted.	1.	*I. Cappa.*
Leaves irregular toothed, pubescent beneath; lateral nerves quite prominent. Receptacle areolate.	2.	*I. eupatorioides.*

1. Inula Cappa *DC.* Vern. *Batabap-arong,* Mik.; *Dieng-ialih,* Synt.

A stout undershrub, often shrubby up to 8 ft. high; branches brownish silky or woolly. *Leaves* 2-6 by ·5-2 in., oblong-lanceolate, distantly cuspidate-serrate, usually acute, coriaceous; upper surface pubescent with adpressed bulb-based hairs, undersurface silky tomentose or woolly; lateral nerves usually 8-12 on either half, rather inconspicuous; petiole up to ·4 in. long. *Heads* about ·2 in. across, in much branched terminal and axillary often corymbose panicles. *Involucral-bracts,* linear, ending in a sharp point. *Receptacle* pitted. *Fruit* ·05 in. long, pubescent. *Pappus* hairs dirty-white, feathery.

N. C. HILLS, KHASI & JAINTIA HILLS, ascending up to 5,000 ft.

Flrs. 8-11. Fr. 12-2.

2. Inula eupatorioides *DC.* Vern. *Kamli,* Nep.

A woolly shrub up to 6 ft. in length; branches pubescent. *Leaves* 1·5-9 by ·5-3 in., elliptic-oblong, lanceolate, irregularly toothed, acuminate, scabertulous above, pubescent beneath; lateral nerves 10-15 on either half, prominent, subparallel, arched; petiole stout, up to ·3 in. long. *Involucral-bracts* adpressed pubescent, lanceolate, subulate. *Receptacle* areolate. *Fruit* adpressed-silky, pubescent. *Pappus* feathery.

KHASI HILLS, ascending up to 6,000 ft.

Flrs. 11. Fr. 2-3.

10. XANTHIUM Linn.

Xanthium Strumarium *Linn.* Vern. *Lokra,* Garo; *Ghagra,* Sylh.; *Ogoro,* Ass.; *Parohanthor,* Mik.

A coarse annual; stem hispidilose or strigillose. *Leaves* 1·5-4·5 in. long and as board, broadly triangular-ovate or

suborbicular, often lobed, acute, scabrid or hispid; petiole ·7-3 in. long. *Flowers* unisexual in single or clustered axillary heads. *Fem. involucres* burr-like, covered with hooked spines; male heads at the top of the inflorescence. *Anthers* exserted; base entire. *Cypsela* enclosed in the hardened cells of the utricle. *Pappus* 0.

Common throughout the province.

Young shoots are eaten cooked. Fruits are slightly narcotic. Useful in many diseases, a good diuretic, powerful diaphoretic and sedative.

Flrs. Cold season. Fr. 4.

11. SIEGESBECKIA Linn.

Siegesbeckia orientalis *Linn.* Vern. *Soh-barthud-lib,* Khasi.

A large erect annual rather coarse herb, almost shrubby up to 4 ft. in length, branched, glandular pubescent. *Leaves* 1·5-4·5 by ·5-2·5 in., upper gradually smaller, opposite, ovate, triangular, coarsely crenate, deeply and irregularly toothed, acute or acuminate, softly pubescent; base cuneate, decurrent on the short petiole (up to ·2 in. long). *Heads* small, yellow, peduncled in leafy panicles. *Invol.-bracts* dissimilar, 2-seriate; outer 5 linear-spathulate, grandular; inner 5 boat-shaped, glandular, embracing the flowers. *Receptacle* concave with many chaffy pales enclosing the bisexual flowers. *Cypsela* glabrous, obovoid, oblong, slightly rough, black, not compressed.

N. E. F. TRACT, KHASI HILLS, ascending up to 6,000 ft.

Antiseptic properties have been ascribed to this forest plant when applied externally to sores. Valuable depurative and has healing properties in gangreneous ulcers and sores.

A mixture of equal parts of the herb and glycerine has been tried with good effect in ring worm and similar parasitic eruption. (I. M. P.).

Flrs. 8-9 & Fr. 10-12.

12. ECLIPTA Linn.

Eclipta alba *Hassk.* Vern. *Kanharaj, Kesaraja,* Ass.; *Kesaraja,* Sans.

A diffuse or erect much branched strigosely hirsute annual. *Leaves* ·5-2·2 by ·2-·6 in., usually oblong, lanceo-

late or elliptic, subentire or distantly toothed, acute or acuminate; base cuneate; petiole slender, short, up to ·2 in. long. *Heads* subglobose, small, heterogamous, short peduncled, solitary or in pairs, axillary or terminal. *Involucre-bracts* biseriate, leafy, ovate-obtuse or acute, strigose; the outer 5 leafy; the inner narrower, about 3. *Receptacle* flattened, pales slender, plumose. *Anther-base* obtuse, sub-acute. *Style-arms* short with obtuse appendages. *Fruit* verrucose, minute, areolate. *Pappus* obsolete or of 1-2 minute teeth.

SIBSAGAR, GOALPÀRA.

In Hindu medicine it is principally used as a tonic and deobstruent in hepatic and splenic enlargements. It is anodyne and absorbent and relieves headache when applied with a little oil. The juice of the leaves is given in one tea-spoonful dose in jaundice and fevers. Its application promotes growth of hair on the shaved scalp. (I. M. Plants).

Flrs. 8-9. Fr. 10-12.

Blainvillea rhomboidea *Cass.*

A rigid scabrous herb. *Leaves* 2-4 in. long, opposite or upper alternate, ovate, seriate, 3-nerved; base cuneate. *Heads* heterogamous, small; *Ligules* whitish or yellowish. *Achenes* cuneate, truncate, marked with faint horizontal lines. (Kew Bulletin, 1934)

13. SPILANTHES Linn.

Spilanthes Acmella *Linn.* Vern. *Huin, Dieng-shir-mit-bar-ngain* (=toy-chillies), Synt.

A trailing herb. *Leaves* ·5-2·2 by ·3-1·2 in., opposite, triangular, ovate or lanceolate, distantly serrate, acute, 3 nerved. *Heads* yellow, solitary or in long terminal panicles; several series of outer flowers with small rays, inner all tubular. *Involucre* ovoid or campanulate; bracts sub-2-seriate, slightly unequal. *Receptacle* elongate; pales enclosing the flowers. *Anther-base* truncate. *Style-arms* rather long, truncate. *Fruit* of disc flowers usually compressed. *Pappus* absent or of 2-3 bristles.

KHASI & JAINTIA HILLS, ascending up to 5,000 ft.
Used by Syntengs for sore mouth, also efficacious for tooth ache.

A bit of lint dipped in the tincture and laid on the gum repeated 3 or 4 times a day has a speedy effect in reducing the pain and swelling. (Pharmacographia Indica Vol. II., p. 283).

Flrs. & Fr. Cold season.

Centipeda orbicularis *Lour.* Vern. *Hachuti* or *Hansia Bon;* Ass.; *Mechitta,* Beng.

A diffuse often prostrate, annual weed of wet places, spreading. *Leaves* alternate, obovate or obovate-oblong, remotely dentate. *Flowers* in solitary, axillary, globose, almost sessile heads; bracts biseriate, spreading in fruit; receptacle naked; calyx-limb 0. *Petals* of female florets connate, obscurely toothed; stamens syngenesious; style short, truncate in bisexual florets. *Cypsela* 4-angled, tip obtuse, angles airy; pappus 0.

SIBSAGAR, 200 ft.

Flrs. 4. Fr. 5-6.

14. ARTEMISIA Linn.

Artemisia vulgaris *Linn.* Vern. *Khel-bijak,* (cotton leaved), Garo; *Sangien, Dieng-tlio,* Synt.

A tall aromatic shrub, often forky, up to 8 ft. high; stem leafy. *Leaves* sessile, 1-3 by ·5-1·5 in., alternate, aromatic, ovate, lobed, laciniate or deeply pinnatisect with stipule-like lobes at the base, pubescent above, white felted beneath; upper leaves smaller, 3 lobed or entire, lanceolate. *Heads* ovoid or subglobose, solitary or fascicled, heterogamous or homogamous. *Invol.-bracts* few seriate, villous, with scarious margins, ovate or oblong, softly woolly, the inner larger, sometime membranous. *Anther-base* obtuse, entire. *Fruit* minute, oblong, ellipsoid. *Pappus* 0.

GARO HILLS, KHASI HILLS, ascending up to 6,000 ft.

Used in asthma and diseases of the brain. It is a valuable stomachic, deobstruent and antispasmodic. Used as a tonic, anthelmintic and espectorant (I. M. Plants).

Flrs. 10. Fr. 3.

A. parviflora Roxb.—A shrubby inodorous perennial (Disc flowers sterile; lower leaves usually simple, cuneate) is also recorded from KHASI HILLS, ascending up to 5,000 ft.

Cremanthodium reniforme *Benth.*

A perennial scapigerous herb, almost glabrous. *Leaves* 4 by 2 in., niform, sinuate-toothed, membranous, glabrous, palmately nerved;

petiole slender, up to 11 in. long. *Scape* about 18 in. long; head about 2 in. across; involucre bracts oblong-lanceolate, acuminate, slightly hairy. *Ligule* yellow, oblong-lanceolate. *Achene* cuneate, ·2 in. long; pappus whitish.

NAGA HILLS, (No. 15,650 up to 10,000 ft.)

Flrs. 9. Fr. Cold season.

C. Thomsoni *C. B. Clarke.*

A perennial scapigerous herb, almost glabrous. *Leaves* subradical, 1-1·5 in. across, reniform, crenate. *Heads* solitary; involucel bracts acuminate, 5 in., oblong-lanceolate. *Ligules* yellow, 3-fid. *Achenes* ·12-·16 in., linear-oblong; pappus reddish-brown.

(Kew Bulletin, 1934.) Delei Valley (13,000 ft.).

Flrs. 7-8.

C. rhodocephalum *Diels.* is also found in the Delei Valley 11-12,000 ft.

15. EMILIA Cass.

Emilia sonchifolia *DC.*

A slender nearly glabrous herb up to about 20 ft. high. *Upper cauline* leaves lanceolate or oblong-lanceolate, auricled; lower leaves 3-4 in. long, lyrately pinnatifid. *Heads* small, few flowered, ·35-·5 in. long. *Involucre* connate tubular, splitting into 8-10 segments in fruit. *Receptacle* naked. *Corolla* lobes short, rosy. *Style-arms* short, subterete, acute. *Cypsela* 5-angled, scabrid. *Pappus* soft, white, copious.

KHASI HILLS, ascending up to 4,000 ft.

In Madras, decoction of the plant is said to be a febrifuge (Rheede). Juice of the leaves is cooling and is prescribed for eye inflammation and also for night blindness (dry).

Flrs. 4. Fr. Rainy season.

16. SENECIO Linn.

Herbs, shrubs or small trees, sometimes scandent. *Leaves* radical or alternate, entire or variously partite. *Heads* usually yellow. *Involucre* cylindric; bracts usually 1-seriate, equal, erect, free or connate at base with an outer row of short bracteoles. *Receptacle* various. *Ray-flrs.* fairly ligulate; disk-flrs. hermaphrodite, tubular, 5-fid. *Corolla* slender. *Anther-base* obtuse, auricled or minutely tailed. *Style-arms* of hermaphrodite flowers recurved, the tips

truncate or penicillate or shortly pointed. *Fruits* subterete or those of outer flowers compressed, 5-10 ribbed. *Pappus* copious or sparse, usually soft, white, smooth, scabrid or barbellate.

Heads few flowered. (12 or less) :—
- All flowers tubular :—
  - Leaves ovate-cordate. A woody climber. 1. *S. araneosus.*
  - Leaves elliptic or elliptic-lanceolate. An undershrub. .. .. 2. *S. lushaiensis.*
- Ligulate flowers 2-5 :—
  - Leaves elliptic or oblong-lanceolate. A woody climber. .. .. 3. *S. triligulatus.*

Heads many-flowered :—
- Climber. Leaves lanceolate or hastate; base auricled. .. .. .. 4. *S. scandens.*
- Erect shrubs :—
  - Anther cells tailed :—
    - Achenes glabrous. Heads in axillary or terminal corymbose panicles. .. .. .. 5. *S. densiflorus.*
    - Achenes laxly villous. Heads larger than (5), ebracteolate. .. 6. *S. Nagensium.*
    - Achenes sub-quadrangular, pilose at the angles. Heads corymbose. Corymbs many peduncled; bracteoles many. .. .. 7. *S. Rhabdos.*

1. Senecio araneosus *DC.* Vern. *Jermei-ja-long-ap,* Khasi.

A large woody climber, (stem sends out roots when in contact with earth.) *Leaves* 3·6·5 by ·5-2·5 in., ovate-cordate, acuminate, entire, serrate or occasionally lobulate, acuminate, glabrous above with loose web of fine cotton underneath, 5-7 nerved at base; petiole up to 3 in. long. *Heads* oblong, about 12 flowered in clusters on the branches of terminal and axillary bracteate corymbs. *Involucral-bracts* 8, linear-obovate, almost glabrous, apex ciliate. *Receptacle* rugose, not hairy. *Corolla* brownish yellow, tipped green. *Pappus* of very fine hairs shorter than the corolla.

KHASI HILLS, ascending up to 5,000 ft.
Flrs. 11.

2. Senecio Lushaiensis *Fischer.*

An undershrub. *Branches* thin, striate with multicellular short hairs, which are dense towards the lower end

Leaves 2·5-4 by ·8-1·2 in., elliptic, elliptic-lanceolate, acute or acuminate, serrate, covered with short reddish crisp hairs along the nerves; lateral nerves 5-6 on either half, conspicuous below; reticulation distinct on the dorsal surface; petiole covered with crisp hairs, ·75-1·25 in. long. *Inflorescence* corymbose, axillary with capitulate peduncles more or less covered with short reddish multicellular crisp hairs. *Bracts* (lower) leaf-like, upper minute, linear. *Capitula* ·3 in. across, 7-10—flowered. *Invol.-bracts* free, 8 (sometimes 2 or 3 minute, linear, lanceolate, extra bracts also occur), sub-acute or obtuse, ·17-·2 in. long. *Receptacle* fimbriate. *Flowers* deeply golden yellow. *Corolla* (ligulate) ·3 in. long, narrow-oblong; lobe more or less obtuse, many nerved. *Style* minute, truncate, penicillate. *Corolla* (tubular) funnel-shaped, ·25 in. long. *Anthers* short, adnate. *Style* thick. *Achenes* cylindrical, gradually amplificated, ·1 in. long, 5 ribbed, glabrous. *Pappus* white, beaked, ·2 in. long.

LUSHAI HILLS, 7,000 ft.

(Mrs. N. E. Parry 574) January.

3. Senecio triligulatus *Ham.*

A glabrous woody climber. *Leaves* 4-5 in. long, elliptic or ovate—lanceolate, caudate-acuminate, more or less serrate, membranous; petiole ·3 in. long. *Inflorescence* puberulous. *Heads* ·25 in. long, few flowered, ebracteolate in axillary and terminal corymbose panicle. *Flowers* 2-3 (ligulate), tubular in each involucre. *Invol.-bracts* 5-8, linear-oblong, ·5 in. long; ligules very short, 2-nerved, loobes of tubular flower revolute. *Achenes* glabrous. *Pappus* dirty-white.

MISHMI HILLS, MANIPUR, NAGA HILLS (Brandis).

(No specimen in the Forest Herbarium).

4. Senecio scandens *Don.*

A pretty climber (shrubby). *Branches* ribbed zig-zag. *Leaves* 2-4 by ·7-1·5 in., ovate-lanceolate or hastate, crenate or distantly denticulate, acuminate, membranous, slightly

villous; base acute or obtusely double bracket-shaped; petiole ·3-·8 in. long, auricled. *Heads* ·3 in. daimeter on the divaricate branches of lax terminal corymbs. *Invol.-bracts* 10-15, linear-oblong, acute; ligules about 8. *Fruit* slender, 4-angled or ribbed. *Pappus* white, filiform, about twice the length of the fruit.

KHASI HILLS, ascending up to 6,000 ft.

Flrs. 9-10. Fr. 12-1.

5. Senecio densiflorus *Wall.*

An undershrub 4-6 ft., more or less gregarious; stem, inflorescence and undersurface of leaves white felted. *Leaves* 4-8 by 1·7-3·5 in., ovate, elliptic or lanceolate, doubly serrate with a thickened margin, acuminate; harsh with scattered stiff hairs above, white felted beneath; lateral nerves 10-15 on either half; petiole up to 1 in. long. *Heads* campanulate in terminal and axillary corymbose panicles. *Invol.-bracts* linear, acute. *Receptacle* pitted and bristly. *Flowers* yellow, outer rayed, inner tubular. *Anthers* yellow with a white tail. *Fruit* glabrous, obscurely 5 fluted; pappus very white, about 30.

KHASI and JAINTIA HILLS, ascending up to 6,000 ft., NAGA HILLS.

The leaves are applied to boils (Stewart).

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

6. Senecio Nagensium *C. B. Clarke.*

A shrub similar to S. densiflorus. *Leaves* 4-6 by 1·5-3 in., upper leaves thin, lanceolate or ovate-elliptic, serrate, coriaceous, acuminate, clothed with cinnamon colour cottony wool, upper side finely araneose; lateral nerves 12-16 on either half; base rounded or obtuse not auricled. *Heads* slightly larger than that of S. densiflorus, ebracteolate, outer whorl of the involucre without black tail. *Achenes* laxly villous.

MANIPUR, (4,000 ft., No. 41984), NAGA HILLS (Journ. of Linn. Soc., Vol. XXXV., p. 39, 1890).

7. Senecio Rhabdos *C. B. Clarke.*

A much branched shrub; young parts pubescent. *Leaves* 3-5 by 1-1·5 in., elliptic-acute or acuminate, serrate, reddish pubescent, biauricular towards the underside of petiole; lateral nerves glandular; base acute; peiole short, ·1-·2 in. long. *Heads* corymbose, axils densely flowered towards the upper ends. *Inflorescence* pubescent; corymb many peduncled; bracteoles many, subulate. *Capitula* numerous. *Invol.-bracts* 5-6, oblong, margins scarious, dorsal side compressed, subglabrous. *Flowers* (tubular), 5-lobed, (ligulate) 3-lobed. *Invol.-bracts* many, overlapping, pale-yellow. *Anthers* towards the base without tail.

Kohima (4,500 ft., 41829), MANIPUR (5,500 ft., 41296).

Flrs. & Fr. Cold season.

S. Simonsii *Clarke.*—A glabrous handsome plant; branches flexuous. *Leaves* 4-5 in. long, broadly elliptic. *Heads* small, 8-10 flowered, ebracteolate. *Pappus* white. *Achenes* 5-angled, glabrous.

Besides above, the following annual and perennial species of Senecio are recorded from the region of the flora—S. chrysanthemoides *DC,* S. obtusatus *Wall,* S. Griffithii *H. f. & T.,* S. ramosus *Wall,* S. linifolious *C. B. Clarke,* S. Meshmi *C. B. Clarke* and S. macranthus *C. B. Clarke.*

17. CIRSIUM H. f. & T.

Cirsium Lepskyle *Petral*=Cnicus Griffithii Hook. f. Vern. *Soh-chiia,* Khasi; *Sumori-kaura,* Nep.

A thistle-like herb. *Leaves* sessile or base auricled, 2·5-6 by ·7-2·5 in., pinnatifid; lobes lanceolate, acute, spinescent, setulose above, white tomentose beneath. *Heads* bisexual. *Invol.-bracts* many seriate; outer short with acicular apex, the rest linear-wavy, aristate or acuminate. *Corolla* 1·25 in. long, 5-lobed. *Anther-base* sagittate, auricled, tails slender. *Style-arms* short, obtuse. *Cypsela* obovoid-oblong, obtusely 4-angled. *Pappus* copious, feathery, unequal, up to 1 in. long, the longer hairs usually clavellate.

KHASI HILLS, ascending up to 6,000 ft., MISHMI HILLS, UPPER ASSAM.

Seeds aromatic, eaten by the Khasis also young shoots by Nepalis.

Flrs. & Fr. Cold season.

Cirsium chinense *Gard et Champ* and C. involucratum *DC.*, also occur in KHASI HILLS.

18. CARTHAMUS Linn. Safflower.

Carthamus tinctorius *Linn.* Vern. *Colap-machu*, Manip.; *Kusumba*, San.

A thistle-like branching herb. *Leaves* sessile, ·5-2 by ·2-·6 in., lanceolate, usually spinosely serrate. *Heads* large, terminal. *Flowers* orange red. *Involucre-bracts* many seriate; outer foliaceous, green, usually spinous; inner-lanceolate, ovate-oblong, acute. *Cypsela* obovoid, 4-angled, truncate with 4 bosses. *Pappus* absent.

MANIPUR, ASSAM (G. Mann's, No. 1885). Cultivated.

The dye is derived from the flowers and the oil from the seeds. The plant has got various medicinal properties (laxative, diaphoretic, remedy for itch, cold and jaundice). The oil is used as a liniment in rheumatism (Stewart).

Flrs. & Fr. Spring season.

19. LEUCOMERIS Don.

Leucomeris decora *Kurz.*

A small deciduous tree; young shoots tomentose. *Leaves* 5-7 in. long, elliptic or elliptic-lanceolate, acuminate, membranous, glabrous on both surfaces when mature; petiole 1-2 in. long. *Flower* heads fragrant, densely crowded at the ends of leafless branchlets. *Involucre-bracts* woolly at the base, outer imbricating along the peduncle. *Flowers* white, fragrant, nearly 1 in. long. *Pappus* pale-brownish, ·5 in. long. *Achenes* about ·5 in. long, densely villous.

MANIPUR (Brandis).

Flrs. 3 (Kurz).

20. TARAXACUM Hall.

Taraxacum officinale *Wigg.*

A scapigerous perennial with milky juice. *Leaves* radical, sessile, narrowly oblong, irregularly pinnatifid; lobes linear or triangular. *Heads* solitary on a hollow leafless scape. *Flowers* yellow, all ligulate. *Involucre* campanulate;

bracts many seriate; inner 1-seriate, linear, erect, tips thickened or clawed; outer ovate, short, erect or recurved. *Receptacle* flat, naked. *Style-arms* long. *Cypsela* glabrous, ribbed, beaked. *Pappus* silky.

KHASI HILLS, 5,000 ft. (Kanjilal's, No. 7161).

Allied to English Dandelion.

Decoction of the roots and leaves is efficacious in chronic disorder of the bowels.

Flrs. 5. Fr. Rainy season.

21. SONCHUS Linn.

Sonchus arvensis *Linn.* Modern name Prenanthes Yakoensis Jeffi, Kew. Bull. 1934. Vern. *Ki-lan-jiat*, Khasi; *Ban-palang*, Beng.

An annual milky herb with creeping rootstock. *Leaves* radical.

KHASI HILLS, 5,000 ft.

Leaves are eaten cooked in curry. Santals use the root for jaundice. The plant is also eaten by horses and cattle.

Flrs. & Fr. 10-2.

Lactuca macrorhiza *Hk. f.*

A glabrous or sparsely villous milky herb. *Leaves* variable, irregularly divided, membranous. *Flowers* clear pale blue. *Ligules* bluish or purplish. *Achenes* blackish, more or less 5 ribbed, flat, narrowed into a white-beak; pappus silky white, deciduous.

LUSHAI HILLS, 6,500 ft. (Wenger 378).

Flrs. 12. (Kew Bulletin, 1932).

L. sativa *Linn* is the garden lettuce. Cultivated throughout India.

Enhydra fluctuans *Lour.* Syn. E. Heloncha DC. Hingtsha repens Roxb. Vern. *Hingcha, Heloncha*, Beng., *Hilamchika*, Sans.

A glabrous marsh-herb; stem prostrate, rooting at the nodes. *Leaves* opposite, sessile, 1-2 in., serrate, gland-punctate beneath. *Heads* terminal or axillary, sub-sessile, ·3-·7 in. across, unilateral or in alternate axils, heterogamous, subradiate; ray flowers female many seriate, fertile, ligule minute, broad, 3-4 toothed; corolla of ray-flowers 3-lobed to one side, disk flowers female fertile or the inner sterile. *Cypsela* oblong, enclosed in the rigid pales; outer dorsally; inner sometimes laterally compressed; pappus 0.

Common throughout the plains districts of both valleys of ASSAM on rich damp soil. (often aquatic.—R. N. De).

The leaves are generally sold in the markets and are eaten as vegetable. Being somewhat bitter they are considered to be wholesome and invigorating and are also regarded as laxative, antibilious and useful in diseases of the skin.

Flrs. & Fr. 12-1.

Gynura nepalensis *DC.*, G. angulosa *DC.*, G. Pseudo-chine *DC.*, and G. crepidioides *Benth* occur in Assam.

STYLIDIACEÆ.

Herbs, rarely undershrubs. *Leaves* alternate or clustered, entire, exstipulate. *Flowers* 1-2 sexual, irregular in panicles, corymbs or racimiform cymes. *Calyx* superior, 2-lipped. *Corolla* rarely regular. *Stamens* 2; filaments connate with the style into a column; anther cells ultimately sub-confluent. *Ovary* inferior, 2-celled; stigma at the apex of the column; ovules numerous in each cell on the middle of the septum. *Capsule* 1-2 celled, 2-valved, valves sometimes cohering at both top and bottom. *Seeds* many, minute, albuminous; embryo minute, next the hilum.

Stylidium Kunthii *Wall.*

A delicate herb. *Leaves* clustered, obovate-spathulate, orbicular. *Inflorescence* glandular hairy. *Flowers* white or purple ·12-·15 in. across. *Calyx* upper lip 3-lobed, lower notched. *Stamens* 2; filaments connate with the style into a column. *Capsule* ·3-·5 in., linear, valves dehiscing from the top.

KHASI HILLS, SYLHET (Wallich).

Flrs. & Fr. 10-1.

FAM. 75. CAMPANULACEÆ.

Herbs, undershrubs or shrubs, erect or climbing, usually with latex. *Leaves* simple, usually alternate (rarely opposite), exstipulate. *Flowers* hermaphrodite (rarely unisexual), regular or zygomorphic, generally 5-merous, axillary or terminal, solitary, racemose or paniculate. *Bracts* small; bracteoles usually absent. *Calyx-tube* adnate to the ovary, usually persistent, and 5 partite (exceptionally more or less). *Corolla* tubular or campanulate, sometimes bilabiate, valvate. *Stamens* 4-6, alternating with the corolla lobes, inserted usually on the edge of the epigynous honey secreting disc (rarely epipetalous); anthers introrse, sometimes united. *Ovary* 2-5 celled; styles simple; stigma lobes as many as carpels, placentation axile; ovules numerous, anatropous. *Fruit* capsular or baccate, sometimes indehiscent and dry. *Seeds* numerous, small, ellipsoid; albumen fleshy; testa usually thin; embryo straight, radicle next the hilum.

Flowers actinomorphic :—

Fruit a capsule with a conical elongated beak. Ovary 3-celled.	**1. Codonopsis.**
Fruit indehiscent, truncate. Ovary 4-6 celled.	**2. Campanumœa.**

Other genera of the family, all herbaceous, viz., Pratia, Lohelia Cephalastigma are also well represented in the region of the Flora.

1. CODONOPSIS Wall.

Codonopsis Griffithii *Clarke.*

A perennial twiner. *Leaves* 5·2·5 by ·4-1 in., opposite and alternate, ovate, elliptic-oblong, entire, acute, membranous, densely silky pilose beneath, less so above; lateral nerves about 6 on either half; base subcordate, truncate-rhomboidal or rounded; petiole slender up to ·7 in. long, sparsely hairy. *Flowers* solitary, axillary or leaf opposed, large, greenish blue with purple veins; peduncles up to

1·3 in. long, pubescent. *Calyx* superior; segments 5, foliaceous. *Corolla* campanulate. *Testa* very much conspicuously reticulated.

KHASI HILLS, up to 5,000 ft.

Flrs. 8. Fr. Cold season.

2. CAMPANUMŒA Blume.

Perennial herbs; root tuberous; stem twining or rambling. *Leaves* usually opposite. *Flowers* solitary, lateral or terminal. *Calyx* inferior or superior, 4-6 partite. *Corolla* superior, campanulate; lobes 4-6. *Fruit* indehiscent.

Stem twining. Leaves obcordate; petiole long up to 1·5 in. long. Inflorescence axillary or leaf opposed. Ovary truncate. Seeds reticulated.	1. *C. javanica.*
Stem erect. Leaves lanceolate; petiole short. Inflorescence terminal. Seeds not reticulated.	2. *C. parviflora.*

1. Campanumœa javanica *Blume.*

Dextrorse Climber. *Leaves* ·5-2 by ·3-1·7 in., obcordate; crenate-serrate, membranous, glabrous; petiole ·3-1·5 in. *Flowers* solitary, axillary or leaf opposed; peduncles ·15-1 in., about ·3 in. across, apetalous. *Calyx* lobes broad, herbaceous. *Anthers* conniving, almost sessile; no style; female flowers large, about 2 in. across. *Corolla* greenish-white marked with irregular purple veins; filaments ·5-·6 in. long; anther slender. *Ovary* truncate; style with 5 spreading petal-like stigmatic lobes. *Seeds* prominently retaiculated.

KHASI HILLS, ascending up to 5,000 ft.

Flrs. 9. Fr. 11.

2. Campanumœa parviflora *Benth.* Vern. *Ja-tyndong*, Khasi.

Erect perennial; branches spreading. *Leaves* 1·5-4·5 by ·3-1·5 in., lanceolate, serrate-acuminate, glaucous beneath; petiole ·1-·2 in. *Inflorescence* terminal. *Flowers* usually 4-merous. *Calyx* with narrow segments, free. *Corolla* small

with a short tube. *Ovary* 4-celled. *Seeds* numerous not reticulated.

KHASI HILLS, up to 600 ft.
Leaves are eaten cooked.
Flrs. 9. Fr. 11.

FAM. 76. VACCINIACEÆ.

Shrubs or small trees often epiphytic; stems often very much thickened at the base. *Leaves* alternate or falsely whorled, entire or serrate, extipulate. *Flowers* bi-sexual, regular in racemes or solitary, axillary; bracts 1; bracteole often 2, frequently thickened and articulate below the ovary. *Calyx-tube* ovoid, adnate to the ovary; limb 5-fid, persistent. *Corolla* tubular, ovoid or campanulate, 5-lobed, deciduous. *Stamens* 10, epigynous, free; anthers opening by apical pores or upwards into 2 tubes opening by slits. *Ovary* inferior, 5-celled or falsely 10-celled; style cylindric; stigma simple. *Fruit* a berry, rarely dry and indehiscent. *Seeds* numerous in each cell (rarely) small, compressed, albuminous; embryo minute.

1. Corolla long, tubular or shortly campanulate with long segments :—
   - Calyx limb 5-fid, tube terete. .. **1. Agapetes.**
   - Calyx limb 5-fid, tube 5-angled or winged, enlarged in fruit. .. **2. Pentapterygium.**

2. Corolla small, campanulate or ovoid with short teeth :—
   - Flowers in axillary racemes; sometimes epiphytic. .. .. .. **3. Vaccinium.**
   - Flowers in corymbs; epiphytic. .. **4. Corallobotrys.**

1. AGAPETES D. Don.

Evergreen shrubs usually epiphytic; stems often thickened at the base. *Leaves* alternate, sometimes falsely whorled. usually coriaceous, often with glands at the apex of the

petiole. *Flowers* usually in axillary corymbs or fascicled, rarely solitary; pedicel often thickened or articulate below the ovary; bracts small. *Calyx-tube* globose; limb 5-partite, persistent, adnate to the ovary. *Corolla* tubular or campanulate, red, often with transverse marks, or the lobes greenish-white, 3-lobed. *Stamens* 10; filaments usually short; anthers elliptic, produced upwards in 2 long beaks opening by apical pores or slits, often spurred behind; style cylindric; stigma capitate. *Berry* globose, succulent or almost dry, often opening by 10 pores round the disc within the calyx teeth. *Seeds* numerous, ellipsoid, outer coat usually very lax.

Corolla long, tubular, lobes short :—
- Anthers not spurred :—
  - Corolla curved at the apex :—
    - Corolla deep red, transverse veins V-shaped .. .. .. 1. *A. setigera.*
  - Corolla straight at the apex :—
    - Calyx supported by an epicalyx :—
      - Corolla bright red, transverse bars obscure :—
        - Fruit bright red, ovoid. 2. *A. auriculata.*
      - Corolla green and white, densely pubescent, V-shaped, transverse, leaves rose coloured :—
        - Fruit globose. .. 3. *A. glabra.*
    - Calyx not supported by an epicalyx :—
      - Corolla ·6 in. long :—
        - Leaves almost sessile, linear-lanceolate. .. 4 *A. salicifolia.*
      - Corolla 1·25 to 1·5 in. long :—
        - No transverse veins in the corolla :—
          - Leaves sub-sessile, elliptic-lanceolate. .. 5. *A. miniata.*
        - V-shaped transverse veins on the corolla :—
          - Leaves petioled, broadly lanceolate. .. 6. *A. macrophylla.*
      - Corolla 1·5-2 in. long :—
        - Darker transverse veins on the pale purple corolla :—
          - Leaves shortly petioled, broadly lanceolate. .. 7. *A. macrantha.*

Corolla ·75-1 in. long.
Peduncles 1 or 2 flowered :—
Leaves lanceolate or oblanceolate, crenate :—
Corolla ·75 in. long. 8. *A. buxifolia.*
Leaves elliptic, serrate :—
Corolla 1 in. long. .. 9. *A. mitrarioides.*

Corolla divided about half way down:—
Anthers not spurred :—
Corolla straight, ·75-1 in. long, crimson with a white tip :—
Leaves lanceolate-caudate-acuminate. .. .. 10. *A. Lobbii.*

Corolla tubular; lobes short :—
Corolla straight :—
Anthers spurred :—
Flowers in corymbs :—
Corolla ·75-1 in. long :—
Calyx-teeth ·12-·16 in. long, acute :—
Leaves petiolate, lanceolate, narrowed at both ends. .. 11. *A. variegata.*

Corolla about 1 in. long :—
Calyx-teeth ·08 in. long, obtuse :—
Leaves lanceolate, acuminate. 12. *A. angulata.*

Corolla 2-2·5 in. long :—
Leaves nearly sessile, oblong-lanceolate. .. .. .. 13. *A. grandiflora.*

Corolla ·25 in. long. Peduncles 1 or 2 flowered :—
Leaves ·5 in. long. .. 14. *A. obovata.*

Corolla 1·5 in. long :—
Leaves ·8-1 in. long. .. 15. *A. Kanjilali.*

Corolla divided to ⅓ its length or more :—
Corolla straight :—
Anthers spurred :—
Leaves short petioled, elliptic, cordate-acuminate. .. .. .. 16. *A. pilifera.*

1. Agapetes setigera *D.Don.* Vern. *Ja-lamut,* Khasi; *La-tang-sang,* Synt.

An epiphytic shrub 6-12 ft. in height with a tuberous base. *Leaves* 3-6 by ·5-2 in., falsely whorled or scattered, elliptic, obovate-lanceolate, entire or very distantly toothed, acuminate, tufted at the internodes, coriaceous, glabrous, crimson-coloured underneath; lateral nerves not prominent, forming an obscure marginal nerve; petiole 0-·05 in. *Corymbs* axillary, peduncled, 6-18 flowered. *Flowers* scarlet or red, 1·2 in. long; pedicels about 1·3 in. long, hairy; bracts 0. *Calyx* green, obconic; teeth 5, lanceolate, altogether ·3 in. long, with spreading pinkish bristle. *Corolla* up to 1 in. long, crimson, tubular, hirsute with V-shaped marks, sometimes obscure on the tube; lobes 5, greenish, ovate. *Anthers* long-tailed not spurred, slightly exserted. *Fruit* ·3 in. across, sub-globose, (enlarged calyx-teeth half the length of the fruit.)

N.-E. F. TRACT. (Burkills No. 36302, 36250, 36382, 36639).
K. & J. HILLS, up to 4,000 ft.

Flrs. 9-3. Fr. 2-5.

Var. verticillata:—Leaves smaller, always entire. *Calyx* reddish. *Corolla* deep red without any V-shaped marking.

KHASI HILLS, up to 4,000 ft.

2. Agapetes auriculata *Hook. f.*

An epiphytic shrub. *Leaves* 3-7 by 1·2-2·2 in., elliptic-oblong, sessile, often falsely whorled, oblong-lanceolate, almost entire-acuminate, coriaceous, glabrous; lateral nerves rather obscure, uniting into a very slender marginal nerve; base rounded. *Flowers* in stout peduncled glabrescent, corymbs proceeding from the whorls of leaves or the old wood; pedicels enlarged, cup-shaped at the apex forming an epicalyx; bracts small. *Calyx* glabrous; teeth ·25 in. long, lanceolate, striate. *Corolla* ·75 in. long, crimson, tubular, urn-shaped (transverse V-shaped marks obscure); filaments ciliate at the top; anthers granular (not spurred). *Fruit* ·25 in., ovoid, bright red.

KHASI HILLS, ascending up to 4,000 ft.

Flrs. 10. Fr. Cold season.

3. Agapetes glabra *Clarke.*

A shrub often epiphytic. *Leaves* 3-6 by 1-2·8 in., sessile, more or less whorled, lanceolate, sometimes elliptic or ovate, entire or obscurely crenate, acuminate, rigidly coriaceous, glabrous, shining above; lateral nerves 3-10 on either half, anastomosing or obscure towards the extremity; base rounded; corymbs densely pubescent; peduncles 1·5-4 in. long, axillary, 5-25 fld; pedicels ·5-·9 in. long, dilated upwards forming an epi-calyx at the apex. *Calyx* teeth acute. *Corolla* densely pubescent; tube narrowed upwards usually with rose coloured V-shaped transverse veins; lobes minute, ·1-·5 in. long. *Anthers* granular (not spurred) *Fruit* ·25 in. across, globose, nearly dry.

KHASI & JAINTIA HILLS, ascending up to 4,000 ft.

Flrs. 3.

4. Agapetes salicifolia *Clarke.*

An epiphytic, glabrous; branches obscurely angular *Leaves* falsely whorled, 3-4 by ·5-·6 in., almost sessile linear-lanceolate, entire, coriaceous, alternate at both ends *Flowers* in glabrous corymbs; bracts short. *Calyx* vermilion (Griffith); teeth acute. *Corolla* vermilion (Griffith) ·6 in long; lobes short, triangular. *Anthers* not spurred.

Mishmi Hills (Griffith). (No specimen in Forest Herbarium).

5. Agapetes miniata *Hk. f.* Vern. *Son-pongpum-helh* Khasi.

A shrub; branches stout, smooth, whitish, lenticellate *Leaves* 3-6 by 1-2·5 in., alternate, elliptic-lanceolate remotely serrate, acuminate or acute, coriaceous, glabrous lateral nerves 10-12 on either half, impressed above prominent beneath; base rounded or cuneate, almost sessile petiole 0-·05 in. long. *Flowers* in glabrous corymbs with numerous short bracts; bracts lanceolate, ·16 in. long. *Corolla* 1·25 in. long; lobes ·16 in. long.

KHASI HILLS, PATKOI RANGE. (No specimen in Forest herbarium).

6. Agapetes macrophylla *Clarke.*

Leaves 9-11 by 3-5 in., broadly lanceolate, acuminate, remotely obscurely crenate-dentate, coriaceous; base cuneate or rounded; petiole ·5 in. long, thick. *Flowers* in corymbs, peduncles up to 2 in. long; pedicels 1-1·5 in.; bracts ·25 in., linear-lanceolate. *Calyx* teeth narrow-lanceolate, ·3 in. *Corolla* 1·25 in. long, red, tubular, transverse; bars V-shaped; lobes ·12-·16 in. long, triangular.

K. & J. HILLS (Griffith) (Kew No. 3476).

7. Agapetes macrantha *Hk. f.* Vern. *Jalmut*, Beng.

An epiphytic shrub. *Leaves* 5-7 by 1·5-2 in., elliptic or ovate-lanceolate, repand serrate, acute or shortly acuminate, coriaceous, glabrous, nerves arching along a prominent marginal nerve; base acute or obtuse; petiole short. *Flowers* fascicled, light red, variegated, 1-1·2 in. long; pedicels slender, ·5-·9 in. long, thickened upwards. *Calyx* teeth glabrous, sharply acute, spreading. *Corolla* tube ·8-1 in. long, (Sibpur sheet). *Anthers* spurred on the beak.

KHASI HILLS.

Flrs. 3-5. Fr. Rainy season.

8. Agapetes buxifolia *Nutt.*

An epiphytic shrub; branches pilose. *Leaves* rather hispid, 1-1·6 by ·4-·6 in., lanceolate, oblanceolate or elliptic, crenate, obtuse, glabrous; lateral nerves obscure, 4-6 on either half; base cuneate, narrowed into a short petiole ·1-·2 in. long. *Peduncles* usually 1-fid. or 2, axillary. *Calyx* obconic, companulate, green, pilose; segments 5, triangular-ovate. *Corolla* tubular, cylindric, bright red; lobes spreading, ovate-lanceolate. *Anthers* linear, crenulate, produced into a pair of connate slender tubes, which reach a little beyond the mouth of the corolla. *Disc* epigynous, entire, angular; style straight, erect, gradually dilated at the truncate obscurely 5-lobed apex.

DAFFLA HILLS (2-3,000 ft.). (Curtis's Botanical Magazine Tab. 5012).

9. Agapetes mitrarioides *Hk. f.*

A small epiphytic. *Branches* slender. *Leaves* ·5-·9 by ·4-·6 in., elliptic or elliptic-ovate, serrate, coriaceous, shining; base rounded; petiole ·1-·2 in. long; peduncles 2-flowered. *Corolla* up to 1 in. long.

MANIPUR (Wall's No. 5984, 7-9,000 ft.) MISHMI HILLS. (No specimen in Assam Herbarium).

10. Agapetes Lobbii *Clarke.*

Branches terete, leafy, glabrous. *Leaves* 3-4 by 1 in., lanceolate, caudate-acuminate, entire, coriaceous; base narrowed into a short petiole, ·16-·25 in. long. *Flowers* in lax, glabrous, peduncled corymbs; peduncles ·2-·5 in. long; pedicels ·25-·75 in. long, epicalyx cupular, entire. *Bracts* ·06 in. long. *Calyx-teeth* ·16 in., lanceolate, subulate. *Corolla* narrow, tubular, crimson with a white tip, ·75-1 in. long. *Anthers* not spurred.

K. & J. HILLS, NAGA HILLS (Brandis).

11. Agapetes variegata *D. Don.* Vern. *Lehra-ber,* Nep.; *Dieng-soh-limut, Jalamut,* Khasi; *Thang-chhang, Dieng-tang-sang,* Synt.

An epiphytic shrub; stem yellowish, smooth; blaze yellowish, turning brown. *Leaves* ·3-9·5 by ·5-2 in., lanceolate, subentire, acuminate, coriaceous; lateral nerves slender, numerous; base narrowed into a thick short petiole 0-·2 in. long. *Flowers* bright red in dense fascicles below the leaves; pedicels slender, glabrous, thickened upwards. *Calyx* brick-red; teeth lanceolate, sharp-pointed. *Corolla* rosy red, tubular with many V-shaped transverse bands of purple-red. *Anthers* spurred. *Fruit* ·3 in. in across, succulent, red to purple; testa shining, minute, foveolate.

LAKHIMPUR, K. & J. HILLS—ascending up to 5,500 ft.

Flrs. 12-4. Fr. Rainy season.

12. Agapetes angulata *Hk. f.*

Branches sharply ridged or angular. *Leaves* 3-4 by 1-1·5 in., lanceolate, acute, obscurely dentate, glabrous; lateral nerves 6-10 on either half, impressed above; base narrowed into a short petiole, similar to *Agapetes variegata*, but calyx-teeth shortly triangular and more obtuse.

N.-E. F. TRACT (Abor expedition. Burkill's No. 36349).

Fl. 1.

13. Agapetes grandiflora *Hk. f.*

A shrub. *Leaves* 3-7·5 by 1-2·5 in., sub-sessile, narrow, elliptic-lanceolate, entire or undulate, obscurely glandular-toothed, glabrous; lateral nerves rather obscure, marginal nerves more or less prominent; base rounded, almost sessile. *Flowers* fascicled on the old wood below the leaves; bracts small; pedicels about 1 in. long, thickened upward in fruit, stout. *Calyx-tube* very short, urn-shaped; teeth lanceolate, ·3-·6 in. long (not supported by an epicalyx). *Corolla* red, marked with transverse bars, tubular, widened upwards; lobes short, lanceolate, ·4 in. long. *Anthers* spurred on the beak, hairy below.

LAKHIMPUR, NAGA HILLS, N.-E. F. TRACTS up to 5,000 ft. (Burkills No. 37193, 37461). GOALPARA (R. N. DE).

Flrs. 12-2. Fr. Hot season.

14. Agapetes obovata *Hk. f.* Vern. *Soh-pelleng, Dieng-soh-la-pydong,* Khasi.

A bushy shrub generally epiphytic or on rocks; young shoots brown-pubescent; young leaves pinkish. *Leaves* ·2-·5 by ·1-·2 in., obovate, obtuse, entire, coriaceous; petiole ·06-·1 in. long. *Flowers* solitary, globose, ·25 in. across, hyaline; buds spindle-shaped, 5-angled, dark-brown; pedicels filiform. *Calyx* minutely verrucose; teeth acute. *Corolla* verrucose outside; tube translucent; lobes recurved. *Stamens* 10; filaments long, triangular or broadly subulate, ciliate, pubescent behind; anther beak spurred; style firm, glabrous, filiform, slightly exceeding the anther

tips. *Fruit* truncate, 10-celled, 4-seeded in each cell. *Seeds* obovoid, bright, glossy, rugose, about ·06 by ·4 in.

K. & J. HILLS—ascending up to 5,000 ft.

Flrs. 9-11. Fr. 4-5.

15. Agapetes Kanjilali *A. Das.* Vern.. *Horugumani,* Lakhimpur.

An epiphytic shrub; young shoots pilose, hairs with reddish persistent bolbous bases, bud scales lanceolate, about ·12 in. long. *Leaves* ·8-1·2 by ·2-4 in., elliptic, oblong or oblanceolate, entire, obtuse, sometimes obscurely mucronate, coriaceous, glabrous; lateral nerves obscure, midrib impressed above, prominent beneath; base narrowed into a short petiole, about ·08 in. long; peduncles usually 2-fid, from old wood below the leaves or sometimes terminal; bracts lanceolate; pedicels pilose, dilated at the apex. *Calyx* pilose outside, obconic, campanulate, ·2-·3 in. long; segments lanceolate, subulate, ·09-·12 in. long. *Corolla* slightly curved, about 1·5 in. long, purple red, tubular, widening upwards, thinly pilose when young, transverse veins absent; lobes short, ·18 in. long, triangular, acute. *Stamens* 1·2 in. long; filaments about ·8 in long, margined; anthers minutely granulose, beaked; beak about ·4 in. long, with a fixed bifurcated posterior process near the base; style elongate, cylindric; stigma capitate. *Fruit* not seen.

LAKHIMPUR (U. Kanjilal's No. 4090)

Flrs. 4.

16. Agapetes pilifera *Hk. f.*

A shrub; branches slender, round, whitish, sparsely hairy. *Leaves* 2·5-3 by 1·1·5 in., ovate or elliptic, cordate, acuminate, entire, membranous, usually glabrous; base rounded; petiole ·16 in. long. *Flowers* fascicled on a short peduncle about ·5 in. long; pedicels slender, hairy, about 1 in. long. *Calyx-teeth* broad-acute, rather blunt. *Corolla* ·3-·4 in. long, divided down to half way; lobes broad; anthers spurred on the beak.

KHASI HILLS, MISHMI HILLS—ascending up to 4,000 ft.

Agapetes nana *Hk. f.*

A small epiphytic; stem thick, tube-like. *Branches thick*, glabrous. *Leaves* 3·5 by 1 in., lanceolate, narrowed at both ends, entire, coriaceous, glabrous; petiole ·05-·2 in. long. *Flowers* in axillary corymbs or from old wood; peduncles up to ·75 in. long; pedicels ·2-·3 in. long, epicalyx usually 10-fid.; bracts minute. *Calyx-teeth* ·12 in., lanceolate, glabrous. *Corolla* ·25-·3 in. long; lobed nearly to the base.

NAGA HILLS, Griffith (Kew No. 3473).

Agapetes marginata *Don.*

An epiphytic shrub with tuberous root 1 ft. long and 5 in. diameter, fusiform. *Leaves* 6-8 by 3-4 in., obovate or elliptic-oblong, bluntly, shortly acuminate, entire, coriaceous, glabrous; lateral nerves numerous, prominent beneath, anastomosing into distinct intramarginal nerve; base somewhat auriculate, sessile. *Flowers* in racemes, alternate; bracts small, triangular. *Calyx* ·5 in., divided nearly to the base; segments 5, linear-oblong, acute or lanceolate, pubescent. *Corolla* 1·5 in. long, tubular, glabrescent, veined outside *Stamens* 10 on the base of the corolla; anthers granular. *Ovary* globose, ·1 in. across.

N.-E. F. TRACT (3,800-5,100 ft.) Burkills No. 36340.

Agapetes nutans *Don.*

An epiphytic with very swollen root stock, pendulous. *Leaves* 3·5-5·5 by ·3-·4 in., linear-lanceolate, acuminate, obscurely toothed towards the apex, otherwise entire, coriaceous, glabrous; lateral nerves obscure, midrib conspicuous; base narrowed into the petiole ·1-·2 in. long. *Flowers* crimson in few fld. (3) umbels; peduncle pubescent, ·2 in. long; pedicels ·5 in., bracts linear, acicular, ·1 in. long. *Calyx* deeply cleft; segments ·2 in., linear-lanceolate. *Corolla* ·9 in. long, glabrous, crimson; lobes green tipped; apex somewhat exserted. *Stamens* 10 on the base of the corolla; pollens granular. *Ovary* globose, ·1 in. across.

N.-E. F. TRACT (5,000 ft.) Burkill's No. 36347.

Flrs. 1.

Agapetes racemosa *Watt.*

Branches lenticelled. *Leaves* 2·5-3·5 by ·7-1 in., elliptic-lanceolate, entire, long-tailed, coriaceous, glabrous; midrib prominent; lateral nerves inconspicuous or irregular; petiole short; racemes axillary, 15-30 fld., 2-3·5 in. long; peduncle rather stout; pedicels ·3-·6 in. long, slender. *Calyx* about ·1 in. long; teeth broadly subulate, sharply pointed. *Corolla* tube 1-1·3 by ·1-·6 in.; lobes ·25-·3 in. long,

slender. *Fruit* ·2-·25 by 1·5-2 in., generally surmounted with the remains of the corolla lobes.

Shillong, Jowai, Kohima.

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

Agapetes Mannii *Hemsl.*

A small dense shrub, often epiphytic; branches slender, brownish, somewhat hispid. *Leaves* 6-9 in. long, lanceolate, spathulate, obtuse, coriaceous, glabrous; nerves obscure or inconspicuous. *Flowers* whitish-green, 7-8, linear, long, pendulous; peduncles solitary. Calyx subcarnose, sparsely puberulous, cup-shaped; teeth 5, acute. *Corolla* lobes short, obtuse, recurved. *Stamens* 10; filaments hirsute; anthers doubly spurred on the back, somewhat curved; style short, exserted. *Fruit* unknown.

KHASI HILLS.—Gustav Mann.

(No specimen in India, Hemsl. in Gart. Chorn 1892 XII 864).

Agapetes manipurensis *Wall. Mss. Leaves* similar to above. *Flowers* in few flowered corymbs. *Corolla* ·3 in. long.

(Brandis Indian Trees p. 405. No specimen in Forest herbarium).

Agapetes discolor *Clarke.*

A small shrub. *Leaves* 1·2-2 by ·4-·6 in., elliptic-lanceolate, acute, distantly toothed, coriaceous, pale beneath; base narrowed in to a short petiole about ·1 in. long. *Flowers* solitary or in twos; pedicels ·6 in. long, cup-shaped at the top. *Corolla* red, about ·5 in. long, campanulate.

AKA HILLS (No. 15739).

Flrs. 6.

2. PENTAPTERYGIUM Klotzsch.

Pentapterygium rugosum *Hk. f.* Vern. *Soh-pydung-synrang*, Khasi.

An epiphytic shrub. *Leaves* 2-4·5 by ·5-1 in., subserrate, alternate, lanceolate, distantly serrate, often with recurved margins, acute, coriaceous, glabrous, rugose; lateral nerves prominent, impressed above; base obtuse or rounded. *Flowers* greenish white, streaked purplish red in lax corymbose fascicles or solitary on the old branch; pedicels thickened, cup-shaped below the ovary. *Calyx-tube* 5-angled; segments triangular, foliaceous and accrescent in fruit.

Corolla up to 1 in. long, tubular, rosy, with transverse marks, shortly 5-lobed; beaks of anthers spurred; style slender, linear, about 1 in. long. *Berry* prominently 5-ribbed.

KHASI HILLS—ascending up to 6,000 ft. (Shillong Peak)

Flrs. 7-8. Fr. Cold season.

Pentapterygium serpens *Klotz.*

An undershrub; branchlets hispid; *Leaves* subsessile, bifarious, ·4-·6 by ·2 in., elliptic-oblong, entire; margin recurved, acute, coriaceous, glabrous; base rounded. *Pedicels* solitary or in pairs. *Corolla* bright-red with V-shaped marks, ·75 in. long. *Anthers* not spurred.

AKA HILLS (No. 15740).

3. VACCINIUM Linn.

Shrubs or small trees, some species epiphytic. *Leaves* alternate or falsely whorled, usually coriaceous. *Flowers* usually small in axillary or terminal racemes, corymbs or fascicles, rarely solitary, usually 1-bracteate and 2 bracteolate. *Calyx-tube* globose; teeth 5, small. *Corolla* tubular or ovoid-campanulate, 5-lobed, white, pink or greenish, deciduous. *Stammens* 10, epigynous, free; anthers oblong, produced at the apex in 2 cylindric tubes with terminal openings. *Ovary* 5 or falsely 10-celled. *Berry* globose, 5-celled, crowned by the calyx-teeth. *Seeds* 1 or more in each cell, ellipsoid, compressed; testa firm, shining, minutely foveolate.

Leaves large, racemes solitary :—
- Leaves serrate; anthers not spurred :—
  - Filaments hairy, bracts linear. .. 1. *V. serratum.*
  - Filaments glabrous, bracts elliptic. .. 2. *V. venosum.*
- Leaves entire; anthers spurred. Flowers bright-red; lateral nerves 5-7 in. long .. 3. *V. Dunalianum.*

Leaves large; racemes more or less panicled; anthers spurred :—
- Leaves 2-3 in. long; bracts lanceolate. .. 4. *V. Donianum.*
- Leaves less than 2 in. long :—
  - Corolla white; bracts leaf-like. .. 5. *V. Griffithianum.*
  - Corolla pink; bracts white. .. 6. *V. retusum.*

1. Vaccinium serratum *Wight.* Vern. *Soh-pydung, Dieng-soh-lardi,* Khasi.

Usually an epiphytic shrub, about 15 ft. in. height, often straggling, with lenticellate branches, often with bud

scales persisting. *Bud* scale linear or subulate, ·2 in. long. *Leaves* crowded at the ends of branches and falsely verticellate, about 1-3·5 by ·4-·8 in., lanceolate, coarsely serrate, acuminate, coriaceous, glabrous; lateral nerves 10-13 on either half tapering at the base to a short petiole. *Flowers* fragrant, greenish-white, ·3-·35 in. long, in second racemes, terminal and sub-terminal, glabrous, 1·5-3 in. long; bracts caducous, ·1 in. long, ovate-acuminate to subulate; bracteoles minute, linear, inserted towards the base of the pedicels; pedicels whitish, gradually dilated to and jointed at the apex. *Calyx* limb very short; lobes triangular-acute, glabrous, ·15 in. long. *Corolla* ovoid-oblong; lobes short; tube pubescent within. *Stamens* 10, dark-brown, epigynous, inserted round the annulate 10 grooved disc, about ·2 in. long (including the anthers); filaments white, sparsely hairy, dilated at the base; anther cells minutely spinulose, produced above into slender cylindric beaks opening by terminal slits. *Ovary* globose, falsely 10-celled; ovules many. *Berry* globose, ·2 in. across, opening by 5 apical slits.

K. & J. HILLS—ascending up to 6,000 ft.

Flrs. 4-5. Fr. 7.

Var. leucobotrys. Vern. *Soh-ryngkham, Soh-um,* Khasi.

Leaves alternate or scattered, 1-1·5 by ·5-·7 in., elliptic, sharply acute, sub-entire, thinly chartaceous; base obtuse or rounded; petiole short, ·1 in.

K. & J. HILLS—ascending up to 5,000 ft.

2. Vaccinium venosum *Wight.*

A stout glabrous epiphyte; branchlets usually glabrous. *Leaves* 3-5 by 1-1·5 in., lanceolate, acute or acuminate, distantly crenate-serrate, coriaceous, glabrous; lateral nerves 10-13 on either half, impressed above, prominent beneath, midrib stout; base rounded or narrowed into the petiole ·0-·15 in. long. *Flowers* in glabrous racemes at the ends of branchlets (several); bracts elliptic, persistent, numerous, embracing the peduncles at the base. *Calyx-tube* harsh, glandular; teeth acute, short. *Corolla* ·5 in. long, ovoid,

glabrous (puberulous, Hooker); filaments glabrous; anthers not spurred.

N.-E. F. TRACT, KHASI HILLS.

Flrs. 3.

Var. hispida-branchlets hispid, leaves smaller.

KHASI HILLS.

Flrs. 1-2. Fr. 2-3.

3. Vaccinium Dunalianum *Wight.* Vern. *Dieng-soh-pydung-li,* Khasi.

A large shrub or a small tree often epiphytic or straggling on rocks; branches terete when green, but angular when dry; stem white, smooth; blaze cream-coloured with brown streaks, turning brown. *Leaves* 2·5-4·5 by ·8-1·2 in., alternate, almost distichous, elliptic-lanceolate, entire, margins often recurved, caudate-acuminate (the tail upto 1 in. long), coriaceous, glabrous; lateral nerves 6-8 on either half, narrowed into a margined petiole ·1-·2 in. *Flowers* greenish-brown or pinkish in sub-umbellate racemes, axillary or terminal; racemes usually 2 in. long, enclosed in imbricate bracts when in bud; bracts ultimately deciduous, ovate, margins scarious. *Calyx* teeth small, triangular, sharply acute. *Corolla* ovoid-conic. *Filaments* glabrous; anthers spurred, dehiscing by apical slits. *Berry* globose, ·25 in. across, dark purplish when ripe.

K. & J. HILLS—ascending up to 6,000 ft.

Flrs. 4-5. Fr. 11-12.

4. Vaccinium Donianum *Wight.* Vern. *Dieng-jing, Dieng-soh-rongkham,* Khasi; *Dieng-sang, Dieng-soh-saryng-kham,* Synt.

A small tree 25′/15″ or a shrub. *Bark* cinnamon colour, dark-brown, splitting in more or less spiral strips; blaze yellowish, turning dark-brown; wood white or cream-coloured. *Leaves* bi-farious, 2-4 by ·4-1·3 in., lanceolate or elliptic-lanceolate, sub-entire or serrulate, cordate, acuminate, sub-coriaceous, glabrous; lateral nerves 5-7 on either half,

slender; base cuneate; petiole very short ·1-·2 in. *Flowers* bright red, in glabrous racemes, axillary or from below current year's leaves, sometimes panicled; pedicels ·5-·6 in. long; bracts lanceolate, deciduous. *Calyx* teeth small, triangular. *Corolla* glabrous, ·35 by ·2 in., tubular-urceolate. *Filaments* hairy; anthers spurred at apex, opening by apical slits. *Berry* many seeded, ·25 in. across, globose.

K. & J. HILLS—ascending up to 6,000 ft.
Leaves are used as vegetable, fruits are eaten.

Flrs. 4-6. Fr. 8-11.

5. Vaccinium Griffithianum *Wight.* Vern. *Soh-ryng-kham*, Khasi.

A small shrub rather gregarious along streams; young shoots pubescent; stem blackish. *Leaves* ·5-1·5 by ·2-·6 in., oblong or elliptic-lanceolate, sharply serrulate, acute, membranous, glabrescent above, sparsely hairy beneath, specially along the nerves; lateral nerves 5-6 on either half, obscure; base acute: petiole very short, pubescent. *Flowers* white, pubescent, often in panicled racemes; bracts large, foliaceous; bracteoles linear, often persistent in fruit; pedicels ·25 in. long, pilose. *Calyx* teeth small, ovate, triangular. *Corolla* ovoid, obscurely ridged; lobes small. *Filaments* hairy; anthers prominently spurred on the beak, opening by apical slits. *Berry* globose, ·17 in. across.

KHASI HILLS, common, ascending up to 6,000 ft.
Fruit is eaten.

Flrs. 4-5. Fr. 7-9.

6. Vaccinium retusum *Hook.*

A large often epiphytic shrub; branches pendent, young pubescent, sometimes drying bluish. *Leaves* ·6-1·2 by ·3-·5 in., obovate, obtuse, entire, coriaceous, glabrous; lateral nerves 3 on either side, obscure; base cuneate; petiole ·1 in. long. *Flowers* in terminal racemes; bracts ·2-·3 in. long, white, membranous, embracing the bud. *Calyx* ·2 in. long, almost obscurely toothed. *Corolla* pinkish with 5 red stripes,

glabrous; lobes short. *Filaments* hairy; anthers dehiscing by split below the apex with large dorsal spurs. *Fruit* ·2 in. across, sub-globose.

NAGA HILLS, MANIPUR (1,000 ft.).

Flrs. 4-5. Fr. 6.

Vaccinium Forrestii *Diels.*

A bushy shrub on the fringe of the forest along the ridgecrest. *Flowers* cream-white, reddened at the base and with red calyx.

Mishmi, Delei Valley at Chibaon, (6,000 ft.) and LUSHAI HILLS.

Flrs. 4.

Vaccinium bancanum *Miq.*

A shrub or tree, terrestrial or epiphytic. *Leaves* 1·5-2·5 by·75-1 in., elliptic, elliptic-oblong or obovate, usually acuminate, entire, coriaceous, glabrous; lateral nerves very fine, 4-6 on either half, rather obscure, midrib impressed above; base shortly narrowed or acute; petiole short, ·1 in. long. *Racemes* pubescent, 2 in. long; pedicels ·2 in. long. *Calyx* shortly 5-toothed, tomentose. *Corolla* glabrous; lobes short, somewhat blunt. *Stamens short;* anthers with short spurs; filaments pubescent. *Style* rather hirsute. *Fruit* globose, like a pea

NAGA HILLS, (Forest Botanist, F. R. I. DehraDun)
(No specimen in Forest herbarium).

Flrs. 2-3. Fr. 6-8.

Vaccinium Nummularia *Hk. f. & T.*

A small rigid epiphyte rooting from the branches. *Leaves* sub-sessile, ·5-·6 in. long, ovate-elliptic; margins recurved, distantly serrate, spinescently acute, coriaceous. *Calyx teeth* short, pinkish. *Corolla* ·2-·3 in. long, tubular, pinkish.

AKA HILLS, (No. 15742).

Flrs. 6.

4. CORALLOBOTRYS Hook. f.

Corallobotrys acuminata *Hk. f.*

A small epiphytic shrub. *Leaves* alternate, 6-9 by 1·5-2·5 in., lanceolate, more or less obtusely serrate, acuminate, coriaceous, glabrous, green above, pale beneath; base cuneate, biglandular; petiole ·3 in., marginate. *Flowers* red in corymbs on the old wood; bracts minute. *Calyx-tube* hemispheric, 5-fid; segments triangular, persistent. *Corolla*

·3 in. long, campanulate, 5 lobed, glabrous or glandular, hairy outside. *Stamens* 10, epigynous, free; anthers produced into 2 short tubes upwards, dehiscing by terminal slits. *Ovary* 5-celled; stigma capitate; ovules numerous in each cell.

LAKHIMPUR, (Dulong Reserve); KHASI HILLS—up to 5,000 ft. Flrs. 3-5.

FAM. 77. ERICACEÆ.

Trees, shrubs or perennial herbs. *Leaves* alternate, often whorled at the ends of branches, entire or serrate: stipules 0. *Flowers* racemed, axillary or solitary; regular or sometimes slightly zygomorphic (Rhododendron). *Calyx* usually free, 5 rarely 4 or 6-fid or cleft; lobes sometimes obscure. *Corolla* hypogynous, usually campanulate, cylindric or urceolate, sometimes deeply lobed, rarely free; lobes usually 4-5, sometimes 10. *Stamens* usually 10, sometimes 5, 8 or up to 20, hypogynous or slightly attached to the base of the corolla; filaments free; anthers oblong; cells often with projecting appendages, usually opening by terminal pores or short slits. *Ovary* usually superior, 4-5-many celled; style slender; stigma capitate, peltate or shortly lobed; ovules many, rarely few on axile placenta. *Fruit* a 5-valved loculicidal or septicidal capsule, sometimes enclosed in succulent calyx. *Seeds* usually many, rarely few in each cell.

I. Capsule dehiscing loculicidally; corolla less than ·5 in. long, ovoid-urceolate or tubular :—

Calyx in fruit, succulent and enlarged, surrounding the capsule; anther cells with two apical setaceous horns on the back. .. .. **1. Gaultheria.**

Calyx in fruit unaltered; filaments produced into two horns at the apex. **2. Pieris.**

II. Capsule dehiscing septicidally; corolla more than 5 in. long, showy, campanulate; filaments or anthers without any appendages. .. .. .. **3. Rhododendron.**

1. GAULTHERIA Linn.

Evergreen erect or procumbent shrubs. *Leaves* alternate, serrate or serrulate. *Flowers* small, sometimes dimorphic, racemose or solitary, bracteate, 2-bracteolate. *Calyx* ovoid, 5-lobed, enlarged, succulent, coloured and almost enclosing the capsular fruit. *Corolla* ovoid-urceolate, greenish white or reddish; teeth small, recurved. *Stamens* 10; filaments more or less dilated and attached to the base of the corolla, pilose; anther cells dorsally 1-2 horned at the apex; in the dimorphic flowers stamens small; anthers simple. *Ovary* 5-celled; style cylindric; stigma simple; ovules many in each cell. *Capsule* 5-celled, loculicidally 5-valved from the apex. *Seeds* many, minute, subglobose, obtusely angled.

Erect shrub, leaves more than 2 in. long, glabrous; flowers in racemes. .. .. *1. G. fragrantissima.*
Procumbent under-shrub, leaves under 1 in. long, undersurface setaceous; flowers solitary. *2. G. nummularioides.*

1. Gaultheria fragrantissima *Wall.* Vern. *Jirhap, Jirhapiong, jirhap-kynthai, Soh-ling-thrait, Jar-ling-thrait,* Kh.

An evergreen shrub up to about 12 ft. in height with thin brownish bark. *Branchlets* margined along the insertion of the leaves, glabrous. *Leaves* 5·2 by 1-2·5 in., faintly aromatic and smelling of methyl salicylate (oil of wintergreen) when bruised, oblong-lanceolate to elliptic-lanceolate or elliptic-rhomboid, acute or acuminate, serrate or serrulate, serratures often ending in minute deciduous setæ, stiffly coriaceous, glabrous and dark green above, paler and punctate with black dots below, nerves impressed above, secondery nerves arcuate, 3-4 on either half, the uppermost two converging to the apex, tertiaries subparallel; base narrowed, sub-acute, cuneate or rhomboid; petiole ·25-·5 in. long, channelled, often tinged with red. *Flowers* ·15-·2 in. long, white, usually ultimately secund in pubescent or puberulous

axillary, racemes ·5-3 in. long; bracts ·05-·1 in. long, broad-ovate or oblong, sub-acute or acute; pedicels usually exceeding the bracts up to ·25 in. long; bracteoles small, opposite towards the top of the pedicel, concave, ovate-acute or obtuse. *Calyx* white, ·1 in. long, deeply 5-lobed; lobes ovate, lanceolate, acute, sometimes sub-acute, ciliate. *Corolla* about ·15 in. long, ovoid, urceolate; teeth very small, reflexed. *Stamens* 10; filaments attached to the base of the corolla, dilated towards the base, pilose; anthers red when young, each cell with two apical setaceous horns on the back. In dimorphic flowers—*stamens* small and anthers (sterile?), without projections. *Ovary* deeply 5-grooved, 5-celled, pubescent at the top; base glabrate and 10 glandular; ovules many in each cell, deep pink. *Capsule* 5-celled, loculicidally 5-valved from the apex, subglobose, ·2 in. across, pubescent, completely surrounded by the deep blue accrescent calyx.

KHASI HILLS, 5,000-6,000 ft. in cool situation.

Similar oil to that obtained from Canadian Wintergreen (G. procumbens) could be distilled from the leaves to which it is reported to be superior in therapeutic properties. Both salicylic acid and carbolic acid of great purity could be obtained from this oil.

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

2. Gaultheria nummularioides *Don.*

A protrate undershrub with densely hirsute stems. *Leaves* ·3-·5 by ·25-·4 in., broad, ovate-acute, glabrous above, setulose beneath and on the margins, base of the bristles glandular, nerves rather indistinct, 2-4 on either half, arched and forming loops near the margin; base rounded or cordate; petiole minute, setose. *Flowers* ·25 in. long, pink or white, axillary, solitary; pedicels ·1 in. long, densely clothed with small glabrous ovate-oblong bracts. *Calyx-teeth* lanceolate. *Corolla* tubular, urceolate; teeth minute, recurved. *Capsule* enclosed by blue-black succulent, calyx both together, ·3 in. across.

KHASI HILLS, 6,000 ft.

Dumpep; Laitlyngkot gorge, locally abundant.

Gaultheria Griffithiana *Wight.*

A shrub with terete branches. *Leaves* 4-7 by 1·2-2 in., elliptic or elliptic-lanceolate, caudate-acuminate, closely serrate, coriaceous,

glabrous, midrib stout, depressed above, punctate below; main lateral nerves usually 4, with a few shorter ones between and also within the last pair of very arched nerves; petiole ·2-·3 in. long, margined. *Racemes* axillary, 3-3·5 in. long, 15-25-fid; pedicels ·25 in. long; bracts ·1-·15 in. long, ovate; bracteoles ovate, usually distant from the ovary, often below the middle of the pedicels. *Calyx* teeth obtuse. *Corolla*, stamens and fruit as in Gaultheria fragrantissima.

Hardly separable by any constant character from Gaultheria fragrantissima.

NAGA HILLS, Clarke (!) Watt (!); KHASI HILLS.

Gaultheria codonantha *Airy-Shaw*.

A large bushy shrub. *Branches* slightly bending, sub-slender, subterete, wide, spreading, ferruginous-setose. *Leaves* distichous, 2·4 by ·9 in., sometimes 7 by 6 in., ovate, elliptic-ovate or lanceolate, acute or acuminate, margin somewhat revolute, shortly toothed, chartaceously coriaceous, glabrescent; nerves impressed above, prominent beneath; base 5-nerved, shallow, cordate or truncately rotundate; petiole robust, ·2-·4 in. long, more or less ferruginous-setose. *Inflorescence* axillary, shortly racemose or corymbose, 4-7 flowered; rachis ·2-·6 in. long; bracts rather ashy velvety. *Flowers* cream in bud, banded with red (often) when fully open large; buds ovoid, conic. *Calyx* shortly cupular, about ·5 in. across; segments 5, deltoidly ovate, ·12-·17 in. long, minutely somewhat ashy tomentose. *Corolla* campanulate, about ·7 in. long; lobes broadly deltoid, about ·33 in. long. *Stamens*—filaments subulate, ·11-·17 in. long; anthers lanceolate-oblong, ·17-·2 in long, ·4 in. broad; base rounded, dorsifixed. *Ovary* depressed, globose ,5 or 6 locular; style columnar, about ·34 in. long; stigma truncate; ovules numerous, angulate. *Fruit* not seen.

(Hooker's Icones Plantarum. Vol. III, part I, 1933 or Vol. xxxiii of the entire work).

ASSAM, Delei valley, about 5,000 ft.
(F. Kingdon Ward No. 8024).

Flrs. 4.

2. PIERIS D. Don.

Trees or shrubs. *Leaves* alternate, entire or serrulate. *Racemes* axillary or panicled at the end of the branches, bracteate and 1-2 bracteolate. *Calyx* 5-fid or partite. *Corolla* ovoid or oblong-urceolate; lobes 5, short, recurved. *Stamens* 10; filaments usually with 2 divaricate horns at the apex. *Ovary* 5-celled; style cylindric, stigma capitulate; ovules many in each cell. *Capsule* globose, loculicidally 5-valved. *Seeds* many, linear-oblong.

Deciduous; leaves entire; racemes usually not panicled. .. .. 1. *P. ovalifolia.*
Evergreen; leaves serrate; racemes usually panicled. .. .. 2. *P. formosa.*

1. Pieris ovalifolia *D. Don. Vern. Diengla samiang, Jarahap,* Kh.

A small often crooked deciduous tree, sometimes only a bushy shrub with blackish brown deeply longitudinally fissured fibrous bark, dead portion up to 1 in. thick; blaze brown. *Young parts* usually pubescent, soon becoming more or less glabrous. *Leaves* 2·5-6·5 by 1-3 in., ovate, oblong-lanceolate, elliptic-oblong or elliptic, acute or acuminate, entire, coriaceous, glabrous, undersurface often pilose; lateral nerves prominent beneath, 8-11 on either half; base rounded; petiole ·15-·5 in. long. *Flowers* ·3-·4 in. long, close together, secund and drooping on terminal and axillary pubescent or puberulous racemes sometimes a few flowers solitary on upper leaf axils or falsely panicled by early fall of leaves; racemes ordinarily 1·5 to 6·5 in., some forms up to 9 in. long; bracts linear, lanceolate or ovate, acute, ·1-·2 in. long, caducous; bracteoles small, linear-oblong; pedicels ·1-·15 in. long, pubescent. *Calyx* connate at the base, triangular-lanceolate or ovate, more or less pubescent, about ·1 in. long. *Corolla* elongate, ovoid, pubescent outside, puberulous within; lobes short, recurved. *Filaments* white, broad, and woolly at the base and slender above with two divaricate setaceous horns at the apex; anther cells ovoid, opening by terminal pores. *Ovary* globose; style cylindric, about as long as the corolla. *Capsule* ·2 in. across, globose, supported by the persistent calyx. *Seeds* many, minute, linear, oblong or falcate.

KHASI & JAINTIA HILLS. Commonly associated with Pinus Khasya, from 3,500 ft. upwards.

The young leaves are poisonous to cattle. The wood is worthless as it shrinks and warps in seasoning. It is also a bad fuel as it is difficult to light and only smoulders.

Flrs. 5-8. According to locality. Fr. 9-10. Leafless for a short time in winter.

1. Var. lanceolata *F. B. I.* Leaves often small, narrower, sometimes only ·6 in. broad; base narrowed, often a bush.

2. Var. pubescens. Leaves pubescent on the upper surface along nerves; racemes lax, 5-9 in. long; filaments slender.

KHASI & JAINTIA HILLS—Borpani.

2. Pieris formosa *D. Don.*

A small evergreen, glabrous tree. *Leaves* 3-6 by ·8-1·2 in., elliptic, acuminate, very finely and regularly serrate, coriaceous, glabrous; lateral nerves about 12 on either half, fairly strong but obscure and irregular; tertiaries strongly reticulate; midrib prominent on both surfaces. *Flowers* white, about ·3 in. long, nodding, in terminal panicled racemes; pedicels ·2-·3 in. long, bracteolate. *Corolla* ·25 in. long. *Filaments* 2 horned at the apex. *Capsule* ·2 in. across, globose.

KHASI HILLS (Brandis).

Flrs. 5.

Craibodendron Mannii *Smith.*=C. Henryi W. W. Smith.

An imperfectly known plant. The species is based on a specimen collected by Gustav Mann from Jowai Road. It had been named Leucocthoe Mannii, King & Prain Mss. in Calcutta Herbarium. Smith founded the genus Craibodendron and in notes of the Royal Botanic Garden, Edinburgh, Vol. XXIV, p. 157-160, 1912, he mentions that the present species should be brought under the genus on account of its close similarity to C. Henryi Smith. The genus Craibodendron is allied to Pieris and Leucocthoe. Its characters are briefly as follows :—

Small trees with alternate entire leaves. *Flowers* small in terminal panicled racemes; pedicels short, bracteate and 2-bracteolate. *Calyx* deeply 5-partite; bases slightly imbricate in bud, persistent. *Corolla* narrowly campanulate, with 5 erect teeth. *Stamens* 10, included; anthers dorsally muticous. *Ovary* globose, 5-locular; ovules many on axile plancentas. *Capsule* depressed, globose, 5 lobed or angled, 5 locular. *Seeds* pendulous, comparatively large, rather few, unilaterally winged.

3. RHODODENDRON Linn.

Trees or shrubs, often scaly or aromatic, usually having large winter buds covered with scales. *Leaves* alternate, often crowded together towards the ends of branches, entire, coriaceous. *Flowers* fascicled or subcorymbose, terminal, rarely solitary or axillary; bracts broad, generally caducous;

bracteoles linear. *Calyx* 5-lobed, sometimes small or obsolete, persistent. *Corolla* campanulate, widely funnel-shaped or cylindric; tube long or short; lobes 5-10. *Stamens* usually 10, sometimes 5 to 18; anthers oblong, dehiscing by terminal pores. *Ovary* 5-20 celled, usually 5-celled; style long or short; stigma capitate; ovules many in each cell. *Capsule* short and woody or elongate and thinner, septicidal, valves breaking away from the placentas. *Seeds* many, albuminous; testa often loose, margined, tailed or crested.

Flowers deep red :—
Trees. .. .. 1. *R. arboreum.*
Flowers white, often tinged with pink :—
Shrub or small tree. .. .. .. 2. *R. formosum.*

1. Rhododendron arboreum *Sm.* Vern. *Tin-saw, Dieng-tin-thuin, Dieng-tiw-thuin,* Kh.; *Burans,* Nep.

A medium sized or small evergreen tree. *Bark* reddish brown, corky, peeling off in small flakes; blaze reddish brown or pinkish with white lines; branchlets glabrate; buds viscous; young parts, pedicels and calyx covered with sticky waxy glands. *Leaves* crowded at the ends of branches 3-6 by ·75-1·75 in., narrow elliptic or oblong-lanceolate, acute, margins recurved, coriaceous and hard, glabrous, with nerves deeply impressed above, undersurface matted with minute buff or greyish waxy scales with hair-like branches, making it appear tomentose or silvery; main secondary nerves prominent beneath, 12-18 on either half, looping near the margin; base narrowed, obtuse to sub-acute; petiole ·3-·7 in. long, dilated at the base, often tinged with red. *Flowers* red, usually deep scarlet, crowded at the ends of branches in corymbose fascicles; bud scales ·3-·6 in. long, suborbicular, acute, brownish, concave; bracts membranous, silky, spathulate, apiculate, margins ciliate, 1-1·2 in. long; pedicels ·2-·4 in. long. *Calyx* subrotate; lobes unequal, about 1 in. long, acute. *Corolla* campanulate, 1·2-1·5 in. long, slightly zygomorphic, with 5 slightly saccate infoldings at the base; lobes unequal, imbricate and crumpled in bud, emarginate at the apex, margins sinuate; tube often black spotted inside. *Stamens* 10, declinate, unequal, alternately long, anterior 5 longest; filaments subulate, reddish at the

base. *Ovary* white or grey, woolly, ·15 in. long, with a purple line at the base, usually 10 ribbed, 10 celled, (7-9 according to some authorities) with a false dissepiment between each, about 1·5 in. long, tinged with red; stigma dilated. *Capsule* 1 in. long, cylindrical, longitudinally ribbed and curved, mealy. *Seeds* ellipsoid, minute.

KHASI HILLS, 5,000-6,000 ft. in cool situations.

Wood brownish or reddish white, close grained, seasons badly. The flowers are used in the form of a paste for obstinate cases of dysentery in Hindu medicine.

Flrs. 3-4. Fr. Autumn and cold season.

2. Rhododendron formosum *Wall.* Vern. *Tiw-la-lih, Diengtiw-lih, Sillong-phumit, Tiw-shyllong-phut-miet, Dieng-soh-tiw-thlong,* Kh.

A branchy shrub, usually 3-5 ft. high, exceptionally upto 8 ft. with brown smooth stems; young shoots setose and thickly dotted with minute round, glandular scales. *Leaves* 1·2-3 by ·3-·7 in., narrow-oblanceolate, acute, subacute or apiculate and ending in a somewhat blunt point, coriaceous, glabrate with age above, persistently scaly beneath, margins long ciliate at least when young; nerves impressed above, secondaries indistinct, tertiaries finely reticulate and distinct on the upper surface; base narrowed to the short scaly and more or less setose ciliate petiole or sometimes sub-sessile. *Flowers* in dense terminal corymbs of 2-5, faintly scented, white or tinged with pink, covered with scales in bud; bud scales ·2-·5 in., suborbicular, broad-ovate or oblong-obovate, minutely ciliate; bracts ·8-1 in. long, spathulate, membranous; pedicels ·3-·6 in. long, stout, dotted with glandular scales. *Calyx* about ·2 in. across, oblique; lobes unequal, anterior obscure, posterior obtuse or rounded, ciliate. *Corolla* broadly campanulate, 1·5-2·5 in. long by 1·5-3 in. across; tube upto 1·5 in. long, often tinged with red or greenish-yellow; lobes 5, slightly unequal, anterior largest with a blotch of spotted yellow or pink inside. *Stamens* 10, unequal usually, alternately long, posterior smallest; filaments slightly declinate, villous on the lower half. *Ovary* glandular, scaly, about ·2 in. long, constricted at the top, longitudinally 5-ridged;

base with projecting glands between the bases of the filaments 5-6 celled; style declinate, exceeding the stamens, dotted with scales towards the base; stigma dilated. *Capsule* oblong, ·5-·6 in. by ·25 in., rugose. *Seeds* ·05 in., acute at both ends shortly tailed.

KHASI & JAINTIA HILLS, 5,000-6,000 ft. Common along water courses.

Flrs. 3-4. Fr. 9.

Rhododendron inæquale *Hutchinson.* Nov. Sp. Notes of the Royal Botanic Gardens, Edinburgh, Vol. XII. R. formosum Wall. Var. inæqualis C. B. Clarke.

A large branchy shrub or a small tree in favourable situations. *Bark* grey, rough, becoming smoother and reddish-brown in old plants, exfoliating in flakes; young parts, undersurface of leaves, bud scales, pedicels and calyx dotted with round scales; young shoots sparingly strigose. *Leaves* 2·4-4·5 by 1-1·7 in., elliptic-oblanceolate or lanceolate to oblong, shortly acuminate or acute, coriaceous, margins slightly recurved, upper surface glabrous with age; lateral nerves 6-11 on either half, impressed above, rather indistinct when green; base subacute or acute; petiole ·3-·6 in. long, grooved on the upper side. *Inflorescence* subumbellately corymbose, 2-6 flowered. *Flowers* white, very handsome, sweet scented; bracts caducous, upto 1·3 in. long, spathulate, ciliate with short soft hairs; pedicels stout, ·2-·5 in. long. *Calyx* saucer-shaped, very oblique, ·4 in across; lobes obscure, unequal, rounded, ciliate. *Corolla* pure white, thinly dotted with scales, outside even when fully developed, 2·8-3·2 by about 4 in. across; tube with 5 pits outside near the base; lobes unequal, posterior largest, 1·25-1·6 in. long, and blotched with yellow inside. *Stamens* 10, unequal, posterior most shortest; filaments slightly declinate, subulate, lower third villous. *Ovary* ·3-·4 in. long, closely lepidote, oblique, constricted at the top, ribbed, 6-celled; style exceeding the stamens, 3-3·5 in. long, declinate, thinly scaly on the lower half; stigma dilated, broad. *Capsule* very oblique, ·8-1·2 in. by ·4 in., densely lepidote, crowned by the remains of the style. *Seeds* ·1-·12 in. long, lanceolate-acute, shortly tailed at the base.

KHASI & JAINTIA HILLS, 5,500-6,000 ft. Laitlyngkot, Kyllang Rook, Serarim, Ryat Laban, etc., not common.

Flrs, 3-4. Fr. 12-1.

Very closely allied is Rhododendron Veitchianum *Hk. f.* which has been recorded from Lushai Hills. It differs mainly by its 5-celled ovary and straight capsule.

Rhododendron iteaphyllum *Hutchinson,* Nov. Sp. Notes of the Royal Botanic Gardens, Edinburgh. Vol. XII. P. 83. R. formosum *Wall.* Var. salicifolium C. B. Clarke.

A branchy shrub; branchlets densely leafy, shoots densely lepidote with round scales and sparingly setose, pilose. *Leaves* 2.3·5 by ·27-·6 in., linear or linear-oblanceolate, narrowed to an acute base, which is decurrent on the short petiole, apex sub-acute or acute, chartaceous, slightly ciliate on the margins when young, thinly lepidote and sometimes a little setose above, more densely scaly beneath; lateral nerves obscure; petiole ·2-·4 in. long, ciliate, deeply grooved above, scaly. *Inflorescence* terminal, subumbellate, about 3-flowered; bud scales fringed with short hairs, not or slightly lepidote; pedicels densely scaly. *Calyx* not or scarcely lobed, scaly outside. *Corolla* white, about 2-2·5 in. long, sparingly scaly. *Stamens* 10, a little exserted. *Ovary* usually 6-celled, densely lepidote; style thinly scaly on the lower half. *Capsule* straight, about ·6 in. long, crowned by the base of the style. *Seeds* ·08 in. long, shortly tailed at one end.

KHASI HILLS in similar situations as R. formosum.

Both R. inæquale and R. iteaphyllum are connected by intermediate forms with R. formosum. The extreme forms are quite distinct. From a close observation of all the three forms in the field I am inclined to think that these are either varieties of the same plant, or hybrids or two or three closely allied species which have interbred freely. C. B. Clarke in *F. B. I.*—as has already been mentioned has reduced R. inæquale and R. iteaphyllum to varieties of R. formosum, The following is a key for separating the three forms :—

Leaves not linear, usually over ·6 in. broad :—	
Capsule straight or slightly oblique at the base, ·6-·8 in. long, margins of leaves ciliate.	*R. formosum.*
Capsule very oblique at the base, ·8-1·2 in. long, leaves not ciliate on the margins.	*R. inæquale.*
Leaves linear, usually less than ·6 in. broad :—	
Capsule more or less straight. ..	*R. iteaphyllum.*

R. inæquale is the most robust form with larger and broader leaves than the others, and delightfully scented flowers.

Rhododendron manipurense *Balf-et Wall.*

A much branched tortuous tree or shrub; young parts lepidote. *Leaves* up to 7 by 3 in., elliptic or oblong-elliptic, sometimes obovate, more or less rounded and mucronate at the apex, coriaceous and thick, shining above, densely lepidote beneath, the scales contiguous or nearly so, from small and brown to large and black; lateral

nerves about 10 on either side; petiole wide, up to about 1 in. long, densely lepidote. *Flowers* pure white, 4-5 together, subumbellate at the ends of branches; flower buds large, ovoid, the outer scales thick; pedicels about ·4 in. long, stout, lepidote. *Calyx* ·6 in. long, 5-lobed to near the base; lobes sub-equal. *Corolla* up to 4 in. long; tube rather narrowly funnel-shaped, longer than the lobes, lepidote outside; lobes 5, rounded. *Stamens* exserted. *Ovary* densely scaly; style scaly nearly to the apex; stigma lobulate, disk-like. *Capsule* ·8-1·5 in. long, scaly, crowned by the remains of the style.

NAGA HILLS, 8-10,000 ft. Japvo, Watt; MANIPUR, Watt.

R. Maddeni *Hk. f.*

A much branched shrub; branches with pale papery bark; branchlets not hairy. *Young parts* scaly. *Leaves* 3-6 by 1-2·5 in., lanceolate or oblong-lanceolate to elliptic, shortly but sharply acuminate, firmly coriaceous, ultimately glabrous above, closely punctate-lepidote beneath with contiguous or very close reddish brown scales, which ultimately fall off; petiole ·6-1 in. long, closely punctulate with remains of the scales. *Flowers* white, usually up to 5 (according to Brandis 4-12) together; bud scales minutely downy; pedicels ·5-·6 in. long, closely lepidote. *Calyx* 5-lobed; lobes very unequal. *Corolla* up to 4 in. across; tube 1·5-1·8 in. long, slightly broader upwards, lepidote outside; limb 5-lobed. *Stamens* 20, as long as the corolla tube; filaments glabrous. *Ovary* 10-celled; style a little extruded, scaly. *Capsule* ·8-1 in. long.

MANIPUR—Watt: NAGA HILLS (Japvo) 8000-10,000 ft.
Flrs. 7.

R. Eliottii *Watt mss. ex Brandis*—Smith in Notes of the Roy. Bot. Gar., Edinburgh. Vol. VIII, p. 214-15.

A small much branched tree. *Leaves* 2·75-5·5 by 1-2·2 in., elliptic-oblong, apiculate, coriaceous, glabrous and shining above, pale and with finely reticulate nervules beneath; petioles stout, ·6-1 in. long. *Flowers* rose purple, with deeper coloured spots on the petals, 10-15 together in corymbs, not scented; pedicels about ·4 in. long, minutely glandular. *Calyx* broadly cupular, persistent. *Corolla* about 2-2·25 in. long, broadly funnel-shaped. *Stamens* 9-10, unequal; anthers deep brown. *Ovary* stellate-tomentose. *Capsule* oblong, ·6-·8 in. long, at first rusty tomentose, ultimately glabrescent, 6-valved.

NAGA HILLS, 9-1,000 ft. Japvo, Watt! C. B. Clarke!
Flrs. 5.

R. Macabeanum *Watt. mss.* ex Balfour in Notes of the Roy. Bot. Gar., Edinburgh. Vol. XII. P. 128-129.

A short stemmed branchy tree. *Leaves* about 11 by 7 in., oblong-elliptic, apex rounded, emarginate with a stiff mucro, dark green and

glabrescent above, undersurface at first greyish white, with interlacing hairs, often nearly black afterwards; petiole about 1 in. long, more or less tomentose. *Flowers* pale-yellow or yellowish white, very many together in a compact umbel; pedicels about ·6 in. long, tomentose, eglandular. *Calyx* almost obsolete, irregularly lobulate, tomentose. *Corolla* tubular, campanulate from a narrow base, about 2 in. long. *Stamens* 16, shorter than the corolla; filaments glabrous; anthers brown. *Ovary* tomentose; style glabrous, slender. *Capsule* slightly curved, about 1·5 in. long, more or less tomentose, dehiscing into 4 valves each having 4 chambers.

Jakpho (Japvo ?). NAGA HILLS, 8,000-9,500 ft. King.

The following species also are recorded by Dr. N. L. Bor, *I.F.S.*, from Piri Hills (Balipara Frontier Tract, Darrang District) above 7,000 ft.

R. Falconeri *Hk. f.*
R. barbatum *Wall.*
R. „ Var. Smithii *Nutt.*
R. Dalhousiæ *Hk. f.*
R. Hodgsoni *Hk. f.*
R. Keysii *Nutt.*
R. Setosum *D. Don.*
R. cinnabarinum *Hk. f.*
R. grande *Wight.*
R. bauhiniflorum *Watt* (Naga Hills).
R. vaccinioides *Hk. f.*
R. Parryæ *Hutch.* (Lushai Hills).

Pyrola rotundifolia *Linn.* Sub. sp. indica Andres.

A perennial glabrous herb. *Leaves* 1·5-1·8 by 1-1·3 in., orbicular, ovate or broadly ovate-entire, usually obtuse, glabrous; base obtuse or cuneate; petiole ·8-1 in. long. *Flowers* in long scapigerous raceme, about 6 in. long. *Calyx* 5 lobed, persistent. *Corolla* lobes 5, deciduous, white and pink (*F B. I.*). *Stamens* 10, hypogynous. *Capsule* ·2-·3 in. across, subglobose.

KHASI AND JAINTIA HILLS. (5,000 ft.)
Flrs. & Fr. Hot season.

FAM. 78. PLUMBAGINACEÆ.

Perennial herbs, undershrubs or shrubs. *Leaves* alternate, entire, usually fleshy, sometimes radical and rosulate, exstipulate. *Flowers* hermaphrodite, regular, pentamerous in terminal scapes or peduncles, capitate, racemed or panicled; bracts rigid with scarious margin; bracteoles 2. *Calyx* inferior, gamosepalous, often tubular, 5-10 ribbed, usually scarious, persistent. *Corolla* hypogynous, salver-shaped. *Petals* free or connate at the base or united in a linear tube. *Stamens* 5, opposite the petals or corolla lobes; filaments nearly free or adnate to the base of the corolla; anthers oblong. *Ovary* superior, 1-celled, 5-angular above; ovule 1, pendulous from a long basal funicle; style 5, free, more or less connate, bilobed. *Capsule* included within the calyx, membranous below, 5 valved and hardened above. *Seed* cylindric; albumen fleshy or 0; embryo straight, radicle superior.

PLUMBAGO Linn.

Leaves alternate, entire, amplexicaul; petiole often auricled at the base. *Flowers* spicate. *Calyx* tubular with stalked glands. *Corolla-tube* slender, long; lobes spreading. *Stamens* free, hypogynous; filaments dilated at the base. *Ovary* attenuated at the apex into a slender style with 5 stigmatose branches. *Capsule* membranous, ultimately circumsciss near the base.

Flowers white. Leaves ovate, abruptly cuneate and running into the margined petiole; base of style glabrous.	1. *P. zeylanica.*
Flowers bright red. Leaves elliptic, gradually tapering into the petiole; base of style hairy. ..	2. *P. rosea.*
Flowers blue. Leaves sub-verticellate. (cultivated).	3. *P. capensis.*

1. Plumbago zeylanica *Linn.* Vern. *Agiasi,* Miri; *Chitrika,* Sanskrit.

An undershrub with glabrous small herbaceous branchlets. *Leaves* 1·5-4·5 by ·8-2·2 in., ovate-acute, entire;

lateral nerves rather obscure; base abruptly cuneate and running into the margined petiole, which is amplexicaul and sometimes auricled at the base. *Flowers* white, ·5-1 in. long, sub-sessile in glandular pubescent terminal or axillary spicate racemes, which are 2-6 in. long; lower bracts leafy; bracteoles ovate-acuminate, shorter than the calyx. *Calyx* free, tubular, covered with shortly stalked glands, persistent. *Corolla* hypocrateriform; lobes oblong, apiculate; filaments equalling the corolla lobes; anthers purple. *Capsule* oblong, apiculate, splitting upwards into 5 valves.

N. E. FRONTIER TRACT.

The root is used in medicine. It is said to be useful for dyspepsia, piles, diarrhoea and skin diseases. It is believed to be caustic and vesicant.

Flrs. April, often later in August & September. Fr. Cold season.

2. Plumbago rosea *Linn.* Vern. *Agechhit,* Ass., *Rakta-chitrika,* Sans.; *Rakti chita.* Beng.

A rambling perennial herb resembling *P. Zeylanica. Leaves* 1-4 by ·5-2 in., elliptic, tapering to a short petiole. *Rachis* of spike glabrous. *Flowers* bright red. *Base* of style hairy.

SIBSAGAR, GOALPARA, also in SYLHET (R. N. De) often cultivated.

It is considered abortifacient and vesicant by Sanskrit and Muhammadan writers. The milky juice is useful in ophthalmia and also as an external application for scabies (*I. M. Plants*).

Flrs. 2., often throughout the year.

3. Plumbago capensis *Thunb.* has blue flowers and subverticillate leaves and is often cultivated in gardens.

FAM. 79. PRIMULACEÆ.

Herbs perennial, rarely annual. *Leaves* all radical or radical and cauline, exstipulate. *Flowers* bisexual, regular, sometimes dimorphic. *Calyx* inferior, 5 (rarely 4-9) cleft. *Corolla* usually hypogynous, rotate, bell or funnel-shaped, 5-lobed. *Stamens* on the corolla-tube opposite the lobes, sometimes with alternating staminodes. *Ovary* 1-celled; stigma undivided, often capitellate; ovules many, amphitropous on a free central placenta. *Capsules* dehiscing transversely or by valves. *Seeds* few or many, usually angular often sunk in the placenta, albumen fleshy or horny, embryo transverse.

Ovary superior :—

Corolla lobes imbricate; tube conspicuous and long. .. .. **1. Primula.**

Corolla lobes contorted; tube inconspicuous (Corolla divided nearly to the base). .. **2. Lysimachia.**

1. PRIMULA Linn.

Primula denticulata *Smith.*

A perennial scapigerous herb, sparingly mealy, almost glabrous. *Rootstocks* stout, thick. *Leaves* all radical (appearing fully developed after the flowers) 2 by ·3-·6 in., (often prolific up to 13 in. long), elliptic-lanceolate, obovate-spathulate, obtuse, minutely toothed or subentire (surrounded at base by leafy scales). *Flowers* capitate. *Corolla* purplish blue; lobes notched. *Capsule* oblong or globose, enclosed by the calyx.

KHASI & JAINTIA HILLS (up to 6,000 ft.).
Flrs. 3. Fr. Rainy season ?

P. prolifera *Wall.* is also recorded from Khasi Hills (4-6,000 ft.).

2. LYSIMACHIA Linn.

Lysimachia ramosa *Wall.*

A perennial weed 2-4 ft., branches winged, quite glabrous. *Leaves* alternate, 1·5-6 by ·5-1·3 in., lanceolate-

acuminate, entire, membranous, glabrous, gland-dotted, narrowed into the petiole, ·05-·5 in. long. *Flowers* yellow, solitary, axillary; pedicels filiform, 1-2·8 in. long. *Calyx*-segments subglandular. *Corolla* elliptic-oblong. *Capsule* ·3 in. across, dehiscing irregularly.

KHASI & JAINTIA HILLS (up to 6,000 ft.).
Flrs. 5-9. Fr. Cold season.

L. evalvis *Wall* and L. japonica *Thunb.*, are also recorded from Khasi Hills.

L. alternifolia *Wall* is found in the Peak Forest of Khasi and Jaintia Hills (R. N. De)

FAM. 80. MYRSINACEÆ

Trees or shrubs or under-shrubs, sometimes climbing. *Leaves* simple, alternate (sometimes opposite), usually gland dotted, exstipulate. *Flowers* actinomorphic, hermaphrodite or polygamo-diœcious, in cymes, racemes or umbles; bracteoles 2. *Calyx* usually free, 5-fid (4-6), usually inferior (half inferior, free in Mæsa) persistent, sometimes slightly accrescent, often gland dotted. *Corolla* gamopetalous, deeply divided or polypetalous; lobes usually 5 (3-7) contorted or imbricate, rarely valvate, often gland dotted. *Stamens* as many as and opposite to the corolla lobes; staminodes sometimes present alternately with the lobes; filaments short, free or more or less connate; anthers introrse, usually dehiscing by longitudinal slits, rarely opening by pores. *Ovary* globose or ovoid, superior or semi-superior (Mæsa), 1-celled; style filiform or columnar; stigma simple, rarely shortly lobed; ovules few or many on a free central placenta. *Fruit* usually baccate; seeds usually globose, several hollowed at the base; albumen pitted or ruminate; embryo transverse.

Ovary half inferior. Calyx thickened enclosing the fruit. Fruit many-seeded. .. .. **1. Mæsa.**

Ovary free. Calyx not thickened, free. Fruit 1-seed:—

Filaments 0 or shorter than anthers:—

Flowers fascicled:—

Corolla lobes imbricate. .. .. **2. Myrsine.**

Flowers racemose or paniculate:—

Corolla lobes usually contorted. .. **3. Embelia.**

Flowers usually umbellate:—

Anthers free; calyx glabrous. .. **4. Ardisia.**

Anthers free; calyx hairy. .. .. **5. Sadiria.**

Anthers connate:—

Corolla shortly connate at base; lobes ovate-acuminate. .. .. **6. Hymenandra.**

Corolla-tube somewhat infundibuliform; lobes emarginate. .. .. **7. Amblyanthus.**

Flowers in sessile umbels. Corolla contorted, right hand edge overlapping. .. **8. Antistrophe.**

Filaments as long as anthers:—

Anthers basifixed; ovary ovoid. .. **9. Amblyanthopsis.**

1. MÆSA Forsk.

Evergreen shrubs or small trees, sometimes straggling. *Leaves* usually pellucid-punctate, sometimes with resinous lines. *Flowers* 5-merous (rarely 4), often unisexual, dicœcious in axillary or terminal often panicled racemes; bracts small. *Calyx* half inferior or nearly free, always semi-adnate to the fruit. *Corolla* rotate or campanulate, rarely urceolate; lobes imbricate, sometimes unequal, rounded with inflexed-tips. *Stamens* inserted in the corolla tube; filaments short; staminodes absent. *Ovary* partially adnate to the calyx; style short; stigma capitate or shortly lobed; ovules many on a globose placenta. *Fruit* small, baccate, globose, crowned with persistent style. *Seeds* many, subtrapezoid.

Corolla almost rotate; lobes as long as or exceeding the tube :—

Leaves toothed, glabrous :—

Calyx segments ciliate. .. .. *1. M. indica.*

Calyx segments not ciliate :—

Inflorescence shorter than the leaf. .. .. *2. M. Chisia.*

Inflorescence longer than the leaf :—		
Stamens not exserted.	3.	*M. paniculata.*
Stamens exserted.	4.	*M. grandiflora.*
Leaves entire, glabrous; lateral nerves 6-9; petiole upto ·6 in. long.	5.	*M. ramentacea.*
Leaves crenately serrate, hairy; lateral nerves 8-13; petiole upto 1 in. long.	6.	*M. argentea.*

1. Mæsa indica *Wall.* Vern *Dieng-soh-jala-tyrkai,* Khasi; *Sesu,* Ass. (Sadiya); *Awua-pat, Machh-pora,* Ass.; *Sirkhi,* Mech; *Samnakhatok,* Garo; *Dieng-pyllein-dakha,* Synt.; *Kisu-tanop, Tasing-Moni,* Miri.

A shrub or a small tree. *Bark* dark-grey; blaze greenish. *Leaves* 2·5-7·5 by 1-3 in., elliptic, elliptic-lanceolate or elliptic-oblong, acute or acuminate, remotely or coarsely toothed, sub-coriaceous, glabrous, pale beneath; lateral nerves 7-15 on either half, rather inconspicuous; petiole ·3-1 in. long, channelled. *Flowers* white, scented, in axillary racemes, which are shorter than the leaves, sometimes branched; bracts much acute. *Calyx* minute; tube more or less adnate to the ovary; segments 5, ovate-obtuse, ciliate, more or less veined. *Corolla* about ·16 in. across; tube very short; lobes imbricate, round. *Stamens* 5; filaments short; anthers brown, dorsifixed. *Ovary* half inferior; ovules many; style short, persistent in fruit, obscurely lobate. *Berries* small, ·15 in. across, pinkish-white, succulent when ripe.

Common throughout the province.

Decoction of the leaves are used for bath in case of fever during convalescence. Ripe fruits are edible.

Flrs. 12-3. Fr. 6-7.

The following separated and classified as distinct species by Mez in Das Pflanzenreich, also occur in the area.

M. montana A. DC., M. elongata Mez., M. coriacea Mez., M. maxima Mez., M. bengalensis Mez., M. manipurensis Mez.

2. Mæsa Chisia *Don.* Vern. *Ja-siet, Dieng-ja-sim,* Khasi; *Thumber,* Kuki; *Gangu-loda,* Kach.; *Susi-porma,* Ass.; *Bilouni,* Nep.; *Dieng-la-thyrma-iong,* Synt.

A gregarious shrub about 15 ft. high. *Bark* brown, warty; blaze greenish; branchlets angled. *Leaves* 3-8 by

1·5-3·5 in., lanceolate, distantly crenate or serrulate, usually long acuminate, membranous, glabrous; lateral nerves slender, 10-12 on either half, arcuate; tertiaries closely anastomosing; base rounded or acute; petiole ·6-·8 in. *Racemes* glabrous, lax, often branched, shorter than the leaves. *Calyx* segments not ciliate. *Fruit* white, spongy, juicy, ·16-·2 in. across.

N.-E. F. TRACT, SIBSAGAR, N. C. HILLS, CACHAR, SYLHET, K. & J. HILLS, ascending up to 5,000 ft., LUSHAI HILLS.

Young shoots and fruits are eaten.

Flrs. 1-2. Fr. 11.

3. Mæsa paniculata (*Wall*) *A. DC.*

A small tree; branches slender, whitish, verrucose. *Leaves* variable in size and shape, usually 3-6 by 1-2 in., elliptic or lanceolate (especially those among the flowers), acute or acuminate, sharply serrate or toothed, chartaceous, glabrous, grey underneath; costal nerve impressed above, prominent beneath; petiole ·5-1 in. long. *Flowers* whitish, about ·1 in. across in lax panicles 4-9 in. long, with very slender branches. *Calyx* not ciliate; segments elliptic, rotundate . *Corolla* lobes ovate, rotundate, crenulate. *Anthers* campanulate. *Stigma* obtuse. *Fruit* globose, ·12-·15 in. across. *Seeds* minute.

No specimen in Forest herbarium (Shillong).
SYLHET (Hk. f. and T), KHASI HILLS (Brandis), LUSHAI HILLS.

4. Mæsa grandiflora *Mez.*

Branches thick, adpressedly ferruginous, lepidote. *Leaves* 8·7 by 3·2 in., elongate-elliptic, acuminate, toothed, membranous, hardly rugose, hairy on the nerves; base shortly acute or rotundate; petiole ·8 in. long. *Inflorescence* panicled; pedicels ·1-·12 in. long. *Flowers* ·17 in. long, and ·33 in. across, regular, 5-7-merous. *Calyx-segements* ovate, rotundate, more or less acute, margin toothed. *Corolla* ·3 in., connate; lobes lineate. *Stamens* exserted; anthers emarginate on both sides, almost dorsifixed. *Ovary* superior; stigma minutely lobed; style short.

ASSAM (Simmons).
(Das Pflanzenreich, Myrsinaceae, Mez., p. 44).

5. Mæsa ramentacea *A. DC.* Vern. *Dieng-soh-eit-iar,* Khasi; *Seketia,* Ass.; *Lajachio,* Naga; *Bol-jakhandok, Thebeloa,* Garo; *Theng-merok-kelok-arong,* Mik.; *Arong,* Kuki.

A large shrub or a small tree (up to 30′/25″). *Bark* dark-brownish, warty, ·3 in. thick having vertical lenticels; blaze greenish-white, turning brownish; wood with a fragrant small light cream turning darkish; branches hanging verrucose. *Leaves* 3-8 by 1-2·3 in., ovate-lanceolate to elliptic-lanceolate, entire, slightly recurved, acuminate, rarely acute, thinly coriaceous, glabrous with long transparent bars; lateral nerves more prominent below, 6-9 on either half, distant; base rounded or acute; petiole up to ·6 in. long. *Flowers* white, small in axillary glabrous compound racemes, usually not exceeding the leaves, sometimes longer or shorter. *Fruit* succulent, dull brownish-white, ·12 in. across. *Seeds* angular, rugose, dark-brown or blackish.

LAKHIMPUR, SIBSAGAR, N. C. HILLS, CACHAR, SYLHET, GARO HILLS, K. & J. HILLS, ascending up to 2,000 ft.

Flrs. 1-4. Fr. 10-11.

6. Mæsa argentea *Wall.*

A large shrub; bark-brownish, twigs hollow; stems shining; branchlets pubescent. *Leaves* 4·5-9 by 2-4 in., elliptic or elliptic-oblong, acute or acuminate, serrate, rather membranous, green above, pale whitish beneath, more or less pubescent on both surfaces especially along the midrib and the nerves; lateral nerves 8-13 on either half, reticulated nerves obscure; base cuneate; petiole up to about 1 in. long, pubescent. *Flowers* in simple or branched short pilose or hairy racemes about half the length of the petiole; bracteoles 2. *Calyx-segments* grabrous, rather acute, somewhat crenulate towards the apex. *Corolla* lobes reniform, minutely crenulate, lanceolate. *Ovary* inferior; stigma obscurely lobed. *Fruit* nearly white, comparatively large.

K. & J. HILLS, ascending up to 6,000 ft.

Flrs. 4-5. Fr. 9.

2. MYRSINE Linn.

Trees or shrubs, usually glabrous. *Leaves* coriaceous. *Flowers* 4-5-merous, small, polygamous or diœcious, sub-sessile or shortly pedicellate, in sessile or shortly pedunculate axillary fascicles; bracts deciduous, densely imbricate. *Calyx* small, persistent. *Corolla* white; lobes connate or free, imbricate or valvate, resin-dotted. *Stamens* united at the base of the corolla. *Ovary* free, globose or ovoid; ovules few or many, immersed in the placenta; style short or almost obsolete; stigma 2-5 or spreading, sometimes sessile. *Fruit* small, globose, dry or fleshy, red or purple, 1-seeded; albumen pitted, scanty, ruminate.

A. Style branches spreading :—		
A small evergreen shrub. Leaves up to 1 in. long, sharply toothed:— Anthers longer than broad. ..	1.	*M. africana.*
A large shrub or small tree. Leaves 2-6 in. long, usually sharply serrate:— Anthers scarcely longer than broad. ..	2.	*M. semiserrata.*
B. Style branches not spreading :—		
A small tree. Leaves 2-7 in. long, entire; petiole marginate. .. .. .. (Mez has put *M. capitellata* under genus Rapanea Aubl.).	3.	*M. capitellata.*

1. Myrsine africana *Linn.*

A small angular shrub; branchlets and petioles rusty-pubescent. *Leaves* ·5-1·5 by ·3-·5 in., lanceolate or obovate, minutely cuspidate-serrate, midrib prominent; petiole minute. *Flowers* small, diœcious, sub-sessile, tetramerous in axillary cluster of 4-6. *Anthers* exceeding the corolla. *Style* short; stigma large, flat. *Fruit* ·15 in. across, usually red, smooth.

KHASI HILLS (U. Kanjilal).

(There is no record in Forest herbarium).

2. Myrsine semiserrata *Wall.*

A shrub or a small tree. *Bark* ashy grey outside, reddish-brown inside with somewhat regular narrow streaks of lighter tissue. *Leaves* 2-5 by ·6-1·3 in., lanceolate-serrate

or sparingly cuspidate-serrate towards the apex, coriaceous, glabrous; lateral nerves slender, 11-13 on either half; base cuneate; petiole ·1-·3 in. long. *Flowers* pinkish, usually 4-merous, ·1 in. across, in dense axillary fascicles or below leaves; pedicels ·2-·8 in. long, glabrous. *Calyx* persistent. *Anthers* large, sessile. *Style* short. *Fruit* ·2-·3 in across, globose, filled with watery juice, bluish or pinkish purple when ripe on filiform pedicels.

K. & J. HILLS, ascending upto 6,000 ft., LUSHAI HILLS.

Flrs. 9-12, sometimes later. Fr. 1-6.

3. Myrsine capitellata *Wall.* Vern. *Dieng-chïng*, Khasi; *Kachidria*, Ass.; *Dieng-shi-ing*, Synt.

A shrub or a small tree, sometimes growing up to 50′/32″. *Bark* warty, ·25 in. thick, exfoliating in small flakes; inside reddish-brown with fairly regular, wedge-shapped, whitish streaks on an oblique section. *Leaves* 3-7 by ·6-2·5 in., lanceolate or elliptic-lanceolate, entire, margins recurved, subacute or acute, chartaceous with red dots aolng the margins, pellucid-punctate elsewhere; lateral nerves slender, 10-16 on either half, midrib fleshy, depressed above; marginate petiole up to ·5 in. long. *Male flowers* globose in bud, whitish with reddish dots and veins in shortly peduncled, fascicle in axils of current years leaves or below the leaves. *Bisexual flowers* fascicled on the stem on slender pedicels, ·25-·4 in. long. *Calyx*-segments ciliate. *Corolla* lobes ultimately recurved; anthers large, reddish, turning purple, sessile on bisexual flowers and on short filaments in male flowers; stigma large, laciniate, reflexed on a short but conspicuous style with a conical base. *Fruit* about ·16 in. across, broader than long, bright purple when ripe.

LAKHIMPUR, K. & J. HIILLS.
Wood with a faint garlic smell, reddish-brown, hard, very elastic, medullary rays close and fine but prominent.

Flrs. 12-1. Fr. 9.

Var. lanceolata *Wall.* Apparently evergreen. *Leaves* smaller (2-4·3 by ·6-1·2 in.) more coriaceous, ascending, crowded at ends of

branchlets; old leaves yellow. *Flowers* fascicled, mostly below the leaves. *Corolla* valvate, red outside, puberulous along margin.

K. & J. HILLS.

Flrs. 12.

3. EMBELIA Burm.

Shrubs or small trees as a rule evergreen, usually most species climbing. *Leaves* alternate, entire or toothed, usually glandular; petiole often margined or glandular. *Flowers* small, whitish or pinkish, hermaphrodite or polygamo-diœcious, in axillary or terminal, simple or compound racemes or panicles; bracts small; bracteoles absent. *Calyx* free, persistent, floral parts usually gland dotted, 4-5 fid or partite. *Corolla* lobes 4-5, slightly coherent at the base, usually imbricate in bud. *Stamens* 4-5; filaments more or less adnate to the petals; anthers ovate-oblong. *Ovary* ovoid or globose; ovules few on a sub-globose placenta; style short; stigma capitellate. *Fruit* small, globose, usually 1-seeded (rarely-2) berry. *Seed* globose, base excavated; testa membranous; albumen pitted or sub-ruminate; embryo transverse, curved.

Petals imbricate in bud, 5-merous :—		
Inflorescence terminal, paniculate :—		
Back of anther masses verrucose.		
Flowers pedicellate.	1.	*E. Ribes.*
Back of anther masses not verrucose.		
Flowers sessile.	2.	*E. sessiliflora.*
Inflorescence not terminal, racemose; petiole ·25-5 in. long.	3.	*E. robusta.*
Inflorescence sub-umbellate. Flowers 5-merous :—		
Inflorescence 7-fid. Ovary pilose. ..	4.	*E. pulchella.*
Inflorescence 5-fid. Ovary glabrous.	5.	*E. parviflora.*
Petals twisted in bud. Flowers 5-merous :—		
Inflorescence amply paniculate. ..	6.	*E. floribunda.*
Inflorescence simple, racemose :—		
Leaves sub-entire, rarely denticulate; racemes ·5-1 in. long.	7.	*E. nutans.*
Leaves conspicuously serrate; racemes 1-2 in. long.	8.	*E. vestita.*
Petals imbricate in bud. Flowers 4-merous :—		
Leaves membranous.	9.	*E. Nagushia.*

1. Embelia Ribes *Burm.* Vern. *Bakul lata,* Ass.; *Mei-ka-e-jaodain,* Synt.

A scandent or scrambling shrub; stem warty, spinescent (arrested branchlets); bark grey. *Leaves* 1·5-4 by ·7-2 in., glabrous with scattered reddish glands; lateral nerves many, very slender, not quite prominent; midrib very prominent beneath; reticulation of nerves marked; base cuneate or rounded; petiole ·2-·5 in. long, glandular margined. *Flowers* usually 5-merous, greenish yellow, small, numerous, in pubescent terminal or axillary lax, panicles; branches 3-4 in., glandular, pubescent; pedicels ·3 in. long; bracts very small, deciduous. *Calyx* ovate, ciliate. *Corolla* lobes imbricate in bud, elliptic, pubescent. ***Fruit*** black, succulent, ·1-·16 in. in diameter.

SIBSAGAR, LAKHIMPUR, K. & J. HILLS.
Flrs. 2.

2. Embelia sessiliflora *Kurz.* Vern. *Soh-jeu-tenk-sai,* Khasi.

A large climber; stem covered with reticulately split grey cork, very similar to *E. Ribes*. *Leaves* small, ovate; base rounded or shallowly sub-cordate; petiole margined but not usually glandular. *Flowers* sessile, whitish; panicles grey pubescent, usually smaller. *Fruit* ·25 in. across, depressed, globose, edible.

K. & J. HILLS.
Flrs. & Fr. -9.

3. Embelia robusta *Roxb.*

A large scrambling shrub or small tree. *Bark* brown with horizontal cracks and numerous lenticels on the branches. *Leaves* 2-5 by 1-2·5 in., ovate-oblong, elliptic or oblanceolate, acuminate, undulate or serrulate, thinly coriaceous, more or less puberulous beneath, especially along the nerves; lateral nerves 6-12 on either half, prominent beneath, arcuate; base cuneate; petiole ·2-·7 in. long, channelled. *Flowers* small, mostly dicœcious in axillary or extra-axillary, more or less pubescent, simple or fascicled

racemes. *Calyx* persistent. *Corolla* lobes reflexed, puberulous. *Anthers* rotundate. *Fruit* globose, red, more or less longitudinally striated, crowned with the remains of the style. *Seeds* usually solitary, globose with a hollow base.

LAKHIMPUR, K. & J. HILLS, ascending up to 5,000 ft.

Flrs. 5-6. Fr. Cold season.

Var. ferruginea *Wall.* Shrub 5-6 feet; branches, inflorescence and leaves beneath rusty tomentose. *Leaves* smaller 1·5-3·3 by 1·2 in. *Male flowers* in axillary undivided racemes, greenish-white, each subtended by a setaceous hairy bract. *Calyx* salver-shaped; calyx and corolla with brown dots. *Corolla* lobes slightly connate at the base, tomentose.

4. Embelia pulchella *Mez.*

Branches slender. *Leaves* ·8 by ·5 in., ovate, rounded or gradually narrowed, almost entire, glabrous, somewhat minutely punctate beneath. *Inflorescence* many fld. subumbellate, rusty glandulose. *Male* flowers: calyx-segments narrowly lanceolate or sublinear, acute; petals narrowed. *Stamens* small; anthers punctate. Feamle flowers: calyx segments rounded, punctate, pilose on the back; petals broadly elliptic, villous. *Ovary* reduced, rusty villous, somewhat ovoid; style glabrous; stigma somewhat capitate, scarcely small.

ASSAM, (Griffith No. 3545). MANIPUR (Watt. No. 7277). (After Mez. Pflanzenreich, Myrsinaceæ, p. 324).

5. Embelia parviflora *Wall.* Vern. *Tille-la-maksiar*, Synt.

A scandent shrub or slender climber. *Bark* brown; branchlets pubescent, branchlets and leaves bifarious. *Leaves* ·5-1 by ·25-·5 in., ovate or elliptic, entire, actute or obtuse, chartaceous, rusty pubescent, underneath black dotted; lateral nerves obscure, 8-10 on either half; base rounded; petiole ·08 in. long, rusty tomentose, channelled. *Flowers* in short axillary rusty pubescent, umbellate raceme. *Calyx* segments fimbriate, ciliate. *Corolla* lobes oblong-rounded, ciliate, glandular. *Stigma* peltate. *Fruit* globose, ·16-·2 in.

across, greenish-white, red in ripening, black when dry, tipped with the remains of the style. (*Fruiting pedicels* filiform, about as long as diameter of fruit, nodding).

K. & J. HILLS, NAGA HILLS, CACHAR.

Flrs. 1. Fr. Hot season.

6. Embelia floribunda *Wall.* Vern. *Ja-buit, Jermïi-jajew,* Khasi; *Naibandon,* Tipp.; *Jajao-raiso, Synt.*

A large climber; branches lenticellate. *Leaves* 1·5-6·5 by ·7-1·5 in., lanceolate, entire, long acuminate, sub-coriaceous, glabrous with a line of reddish glandular dots along the margins; lateral nerves very fine, about 30 on either half, just visible on the upper surface, obscure beneath; base more or less rounded; petiole ·2-·6 in. long, glandular. *Flowers* usually 5-merous, small, dull or greenish-white, in axillary puberulous panicled raceme; pedicels ·07 in. long. *Corolla* lobes slightly overlapping to the right, oblong or ovate, pubescent within, recurved in open flowers. *Fruit* greenish to pinkish-black when fully ripe with a sweetish juice, ·15 in. across.

SIBSAGAR, DARRANG, K. & J. HILLS, ascending up to 5,000 ft.

Flrs. 11-1. Fr. 6-10.

7. Embelia nutans *Wall.* Vern. *Bon-mirica, Chaurasi-lewa,* Ass.; *Thibihi,* Mik.

A fairly large woody climber; young shoots rusty, pilose; stem lenticellate. *Leaves* ·8-3·5 by ·5-1·5 in., oblong-ovate or oblong-entire, sometimes obscurely crenulate towards the apex, bluntly acuminate, membranous, gland dotted, paler beneath; midrib sparingly rusty, puberulous; lateral nerves very slender, many, almost sub-parallel; base rounded or acute; petiole ·2-·5 in. long, rusty pubscent, shallowly channelled. *Flowers* small, 5-merous, in axillary rusty pubescent, simple racemes, about ·7 in. long; pedicels about ·1 in. long. *Calyx* segments glabrous, triangular, acute. *Corolla* rotate; lobes oblong with glandular hairs,

twisted in bud with unpleasant smell. *Ovary* beaked. *Fruit* globose, ·2 in. across.

LAKHIMPUR, SIBSAGAR, KAMRUP, GOALPARA, SYLHET, KHASI & JAINTIA HILLS, ascending up to 5,000 ft.
Leaves are used for fermenting country liquor.

Flrs. 2. Fr. 5.

8. Embelia vestita *Roxb.* Vern. *Mei-jajeo,* Khasi.

A scandent fairly woody shrub. *Bark* whitish-grey, warty, often with numerous lenticels; blaze yellowish. *Leaves* 1·5-3 by ·5-1·2 in., oblong-lanceolate or elliptic-lanceolate, closely serrulate, bluntly acuminate, gland-dotted, glossy, green above, glabrous; lateral nerves many, very slender; base rounded or acute; petiole ·25-·3 in. long. *Flowers* small, in rusty pubescent, simple racemes, up to 2·2 in. long, axillary or arising from old wood; pedicels ·15 in. long. *Calyx* segments triangular, obtuse, punctate. *Corolla* lobes oblong, punctate, twisted in bud. *Ovary* beaked, punctate. *Fruit* globose, ·15 in. across.

NOWGONG, K. & J. HILLS, ascending up to 5,800 ft.

Flrs. 12-1. Fr. 3-5.

9. Embelia Nagushia *Don. Prodr.* E. undulata Mez. Vern. *Dieng-sai, Mei-jajeu-khlaw,* Khasi; *Bon-pui,* Ass.

An extensive evergreen woody climber. *Bark* dark-grey, rough, ·12 in. thick with vertical cracks on old stem; blaze first layer green and inside brown with vertical lines. *Leaves* 1·5-5 by ·8-2 in., acid, elliptic or obovate-lanceolate, entire, acuminate, acute or obtuse, rather membranous, dark-green, glabrous; lateral nerves many, very slender, sub-parallel, arcuate; base acute or cuneate; petiole ·2-·6 in. long. *Flowers* 4-merous, often hermaphrodite, in axillary simple racemes up to 1·25 in. long, usually from old leafless branches; pedicels usually ·1 in. long. *Calyx* segments triangular, acute, ·1 in. long. *Corolla* lobes oblong, obtuse, ·15 in. long. *Fruit* ·25-·3 in. across, globose, depressed, red when ripe; albumen ruminate with longitudinal streaks.

DARRANG, KAMRUP, K. & J. HILLS, ascending up to 5,000 ft.

Leaves are eaten cooked with fish.

Flrs. 3-6. Fr. 9-12.

E. Subcoriacea (Clarke) *Mez Nov. Sp.* Vern. *Poimuri-tenga,* Ass.; *Trimong-ribute,* Mik.; *Jermai-masi,* Synt.

An extensive climber. *Leaves* 2·5-5 by ·8-2·5 in., usually acute or sub-obtuse with translucent bars and dots; base cuneate; petiole up to ·7 in. long. *Flowers* in racemes about 3 in. long, arising from old wood. *Fruit* red, similar to *E. Nagushia.*

N.-E. F. LAKHIMPUR, SIBSAGAR, K. & J. HILLS, up to 6,000 ft.

Leaves eaten by Khasis.

Flrs. 5-6. Fr. Cold season.

(This variety of Clarke is described as a distinct species E. subcoriacea (Clarke) Mez, by Mez in Pflazenreich, Myrsinaceae, p. 329).

E. Clarkei *Bedd et Mez.*

Branches slender. *Leaves* ovate, finely acuminate, chartaceous; petiole ·2 in. long. *Inflorescence* sub-umbellate, 7-12 flowered. *Calyx* segments shortly connate at the base, elliptic, rotundate, ciliate, somewhat punctate. *Corolla* lobes elliptic; male flower acute. *Anthers* mucronate; female flower rotundate, densely papillose inside, somewhat punctate. *Ovary* ovoid; style cylindric; stigma disciform.

E. myrtifolia *Hemsl et Mez.*

Branches slender, densely ferruginous-tomentose. *Leaves* ·6 by ·3 in., rotundate, entire, chartaceous; petiole ·02 in. long. *Inflorescence* sub-umbellate, 3-5-flowered. *Calyx* segments somewhat connate, ovate-ligulate, rotundate. *Corolla* lobes of male flowers oblong, of female flowers elliptic, narrowly rotundate or somewhat acute, punctulate towards the apex. *Filaments* manifest. *Ovary*-female flowers : sub-globose; style long; stigma disciform. *Albumen* minute.

4. ARDISIA Swartz.

Shrubs or small trees. *Leaves* usually gland dotted. *Flowers* actinomorphic, hermaphrodite, in axillary or terminal, simple or compound umbels or racemes; bracts small, usually deciduous. *Calyx* segments 5 (rarely 4), persistent, somewhat accrescent in fruit. *Corolla* lobes 5 (rarely 4-6), usually acute, twisted to the right in bud. *Stamens* as many as and opposite to the corolla lobes; filaments short; anthers free, ovate-lanceolate or sagittate,

acute, usually dehiscing longitudinally and introrsely. *Ovary* globose or ovoid, narrowed to the apex; style cylindric; stigma punctiform; ovules few, immersed in a globose placenta. *Fruit* sub-globose or globose, usually pointed with the persistent style. *Seed* solitary, globose; albumen pitted or ruminate; embryo transverse.

Inflorescence lateral. Sepals broad, overlapping with the right hand edge. Style shorter than the petals in bud :—

Leaves entire :—

Leaves glabrous :—

Flowers in corymbs. Leaf blade 3-8 in., obovate or oblong-elliptic, fleshy, coriaceous. .. .. .. 1. *A. humilis.*

Flowers in bracteate racemes. Leaf blade 5·5-10 in., membranous. .. 2. *A. polycephala.*

Flowers in lax few-flowered racemes :—

Leaf blade 1·5-5·5 in., thinly coriaceous. .. .. .. 3. *A. oxyphylla.*

Leaf blade 3-4·5 in., elliptic-lanceolate, entire or obscurely serrate. 4. *A. rhynchophylla.*

Flowers in pedunculate umbels. Leaf blade 2-5 in., linear-lanceolate or oblanceolate. .. .. .. 5. *A. khasiana.*

Flowers in involucrate umbels. Leaf blade about ·5 in long, ovate-oblong. 6. *A. involucrata.*

Leaves hairy beneath :—

Blade about 8 in. Branches rusty villous. .. .. 7. *A. grandifolia.*

Inflorescence terminal or axillary. Sepals narrow, open in bud. Style longer than the petals in bud. Leaves entire (except A. Icara) :—

Sepals and petals not punctate. Leaves serrulate. .. .. 8. *A. Icara.*

Flowers in large terminal panicles. .. 9. *A. floribunda.*

Flowers in compound umbels. .. 10. *A. depressa.*

Sepals and petals distinctly punctate:—

Flowers in pedunculate compound corymbs; pedicel ·4 in. long. .. 11. *A. pedunculosa.*

Flowers in large terminal panicles :—

Fruit obtusely 5-angular. .. 12. *A. quinquangularis*

Fruit vertically striated. .. 13. *A. Griffithii.*

Flowers small in large sub-pyramidal compound panicles; pedicels ·1 in. long; branches ferruginous, lepidote:—
Fruit smooth. .. .. 14. *A. colorata.*
Inflorescence terminal, panicled, supported by false whorl of leaves :—
Leaves entire :—
Sepals and petals not punctate.
Flowers in terminal pyramidal panicles. .. .. 15. *A. paniculata.*
Leaves crenate or serrate :—
Branchlets and petioles glabrous :—
Ovary ovoid :—
Berries bright red or purplish, ·3-·6 in. across. Leaves with a row of raised dots on the margin. Petals ·25-·3 in. 16. *A. macrocarpa.*
Berries about half the above. Leaves without a row of raised dots on the margin. Petals smaller than the above. 17. *A. crispa.*
Ovary ellipsoid. Berries yellow, spotted, ·25.·3 in. across. Leaves 4-7 in. long. .. 18. *A. virens.*
Branchlets and petioles hairy. Leaves 3·5-6·5 in. long, membranous. Berries scarlet, ·25 in. across. .. .. 19. *A. odontophylla.*

1. Ardisia humilis *Vahl.* (including var. arborescens Wall). Vern. *Thantup,* Manip.; *Detao,* Mik.; *Aria,* E. Bengal; *Chauldhoa,* Ass.; *Thai-gidhioh-phang,* Khasi; *Praudettod-arong,* Mik.

A large glabrous shrub. *Leaves* 3-8 by ·7-3·5 in., obovate-oblong or elliptic, acute or shortly acuminate, entire, fleshy, coriaceous, glabrous; lateral nerves rather obscure; base narrowed into a marginate petiole up to ·5 in. long. *Flowers* pinkish, about ·5 in. across, in pedunculate mostly axillary corymbose racemes; pedicels 1-2 in. long; bracts deciduous. *Calyx* segments obtuse, oval or rounded, more or less ciliate, black dotted, slightly accrescent in fruit. *Corolla* lobes acute, black-dotted, twisted to the right in bud. *Filaments* short; anthers acute. *Fruit* sub-globose, size of a pea, ·3 in. across, blackish when ripe, slightly depressed, scarcely striate.

N. LAKHIMPUR, SIBSAGAR, CACHAR, KAMRUP, NOWGONG, GOALPARA, N. C. HILLS, K. & J. HILLS, ascending up to 4,000 ft.
Bark (in paste) is said to be efficacious in snake bite and is applied on the part stricken.

Flrs. 6-7. Fr. Cold season.

2. Ardisia polycephala *Wall.* Vern. *Dieng-soh-si-ing*, Khasi; *Thaidi-bu*, Kach.; *Toidong-thing*, Kuki.

A small tree. *Bark* brownish-grey with close horizontal wrinkles and warts; inside reddish-brown; inner half with straight fibres, outer granular with horizontal canal, exuding a reddish gum. *Leaves* 5·5-10 by 2·2-3 in., oblong-lanceolate or elliptic-lanceolate, acute, entire, membranous, glabrous; lateral nerves numerous (about 30 on either half), slender, distinct; base narrowed into a petiole up to 1 in. long. *Flowers* ·6 in. in diameter, waxy, light pink in bracteate corymbose racemes; peduncles 3-4 in. long; pedicels ·5-1 in. long. *Calyx* segments sparsely ciliate, ovate, obtuse, very small. *Corolla* lobes fleshy, shining, waxy, recurved in open flowers. *Berry* globose, obscurely striate.

N. C. HILLS, MANIPUR, K. & J. HILLS.
Fruits and young plants are eaten. Medullary rays very fine close and straight.

Flrs. 4. Fr. 12-6.

3. Ardisia oxyphylla *Wall.*

An under-shrub; stem grey. *Leaves* 1·5-5·5 by ·4-2 in., oblanceolate or elliptic-lanceolate, almost entire, acute or acuminate, thinly coriaceous, glabrous; lateral nerves very slender, distinct; base cuneate or acute; petiole up to ·3 in. long. *Flowers* in axillary few flowered racemes. *Calyx* segments rounded, crenately ciliate. *Corolla* lobes assymetrically ovate, oblique, sub-acuminate, punctate. *Stamens* somewhat shorter than the corolla lobes. *Ovary* sub-ovoid. *Fruit* depressed, globose, red when ripe, obscurely striate on pedicels ·5-·6 in. long.

K. & J. HILLS, ascending up to 6,000 ft.

Flrs. & Fr. Cold season.

4. Ardisia rhynchophylla *Clarke.*

A small branched shrub. *Leaves* 3-4·5 by 1-1·25 in., elliptic-lanceolate or obovate-lanceolate, entire or obscurely serrate, acuminate, thinly coriaceous, glabrous; lateral nerves impressed above, prominent beneath, about 11 on either half, arcuate; base cuneate; petiole up to ·35 in. long. *Flowers* small in shortly pedunculate few flowered lax racemes; pedicels about 1 in. long. *Calyx* segments concave, elliptic. *Calyx* lobes ovate, acuminate, densely punctate. *Ovary* ovoid. *Fruit* globose, ·2 in. across.

K. & J. HILLS, 5,000 ft. (Mann's No. 910).

Flrs. 5. Fr. Cold season.

5. Ardisia khasiana *Clarke.*

Under shrub 3 ft. high in shade; young branchlets hairy. *Leaves* 2-5 by ·3-1 in., more or less crowded towards the summit of branchlets, linear-lanceolate or oblanceolate, entire, acuminate, glabrous, gland dotted; lateral nerves numerous, prominent beneath, very slender, oblique, arcuate; base narrowed into petiole up to .3 in. long. *Flowers* in few flowered axillary pedunculate glabrous umbels; peduncles 1 in. long, pedicels about 1 in. long. *Calyx*-segments broadly elliptic, more or less orbicular in fruit. *Corolla* lobes assymetric, acuminate, narrowly rotundate, black dotted. *Filaments* somewhat shorter than the corolla lobes. *Ovary* ellipsoid. *Fruit* purplish-black when ripe, fleshy, ·25 in. across, depressed, scarcely striate.

CACHAR, LUSHAI HILLS, MANIPUR, KHASI HILLS, ascending up to 6,000 ft.

Flrs. 6-9. Fr. 11-2.

Var. Thomsoni *Clarke. Leaves* obovate-lanceolate, 5 by 1·75 in. *Anther back* not punctate; style base granulate.

KHASI HILLS, (3-4,000 ft.).

It is separated as a distinct species. **A. Thomsoni** (Clarke) Mez., Mez in Pflanzenreich Myrsinaceæ.

6. Ardisia involucrata *Kurz.*

A shrub; branches rather glabrous. *Leaves* about 3·5-8 by 1·5-3 in., oblong or ovate, bluntly acuminate, scarcely

acute, rather opaque; lateral nerves 12-20 on either half, slender, parallel; gland-dots conspicuous; base deccurent; petiole ·2-·4 in. long. *Flowers* in lateral involucrate umbels; peduncles stout, 1-3 in. long; pedicels 2-5; bracts many, persistent. *Calyx*-segments large, waxy, pinkish. *Corolla* lobes ·3-·5 in. long, black dotted. *Filments* short. *Ovary* large, glabrous, globose. *Berry* about ·25 in. across, scarcely striate (Calyx enlarged in fruit connivent over the berries-Brandis).

GOALPARA.

Flrs. Rainy season. Fr. Cold season.

7. Ardisia grandifolia *A. DC.*

Branches densely villous. *Leaves* 12 by 4 in., ovate-oblong or oblong-elliptic, shortly acuminate, chartaceous, glabrous above, rusty puberulous at least on the nerves beneath; lateral nerves, slender, conspicuous; base gradually narrowed into the petiole ·2-1 in. long. *Inflorescence* lateral; peduncles pilose bearing umbels. *Calyx* segments somewhat elliptic, more or less acute, ciliate, scarcely punctate. *Berries* globose, about ·25 in. across.

CACHAR, MANIPUR (Brandis).

8. Ardisia Icara *Ham.* Vern. *Paysa-changne,* Duff.

A large shrub sometimes gregarious in beds of nalas; main stem often with raised black warts. *Stem* greenish-grey, shining. *Leaves* 2·5-7·5 by ·7-2 in., usually elliptic-lanceolate, shortly acuminate or acute, distinctly crenulate, more or less entire towards the base, thinly coriaceous, glabrous but sparingly punctate; lateral nerves numerous, very slender, more or less parallel, getting rather obscure towards the margin; base cuneate; petiole ·2-·5 in. long. *Flowers* small in densely crowded ample racemed rusty panicles; bracts foliaceous, with rusty scales beneath; brancteoles linear, smaller. *Calyx* segments rusty puberulous, linear-lanceolate, acute. *Corolla* lobes assymetric, ovate, narrowly rotundate. *Style* not longer than the corolla. *Fruit* obscurely pentagonal.

N.-E. F., LAKHIMPUR, SIBSAGAR, DARRANG, KAMRUP, GOALPARA.

Flrs. 4. Fr. Cold season.

9. Ardisia floribunda *Wall.* Vern. *Theilang-rong,* Tipp.; *Bhaujawa,* Synt.; *Thengpi-chorleng,* Mik.

A large shrub or a small tree. *Bark* greyish-white, thin with minute vertical lenticels; blaze greenish-brown; wood white. *Leaves* 5-10 by 1·3-3 in., narrow-lanceolate or elliptic or oblong-lanceolate, entire, acute, membranous, glabrous, gland dotted; lateral nerves transverse, slender, parallel, arcuate, prominent beneath; base attenuate; petiole stout, up to ·5 in. long. *Flowers* reddish in large minutely rusty, lepidote panicles; peduncles 3-4 in. long; pedicels umbelled, ·25 in. long. *Calyx* segments ovate, minutely red-dotted. *Corolla* lobes assymetric-ovate. *Anthers* minute; style filiform, ·3 in. long. *Fruit* depressed, red-dotted, 5-angled.

SIBSAGAR, CACHAR, SYLHET, GOALPARA, K. & J. HILLS, ascending up to 4,000 ft.

Ripe fruits are eaten.

Flrs. 6-11. Fr. Cold season. Often flrs. and frs. throughout the year.

10. Ardisia depressa *Clarke.* Vern. *Pashalaranga,* Ass.; *Ponglubasi-change,* Duff.

A shrub 10 ft. high; bark greyish-white, warty, green below the cuticle, ·12 in. thick; blaze-reddish; wood cream coloured. *Leaves* 1·5-7 by ·7-2 in., elliptic-lanceolate or nearly oblong-lanceolate, entire, acuminate, thinly coriaceous, glabrous; lateral nerves numerous, sub-parallel, very slender with an obscure intramarginal nerve; base acute; petiole ·2-·6 in. long, rusty tomentose. *Flowers* small, pinkish in long pedunculate much branched, cymose umbels axillary, lateral or on small branchlets. *Calyx* segments spreading, ovate-lanceolate, acute, pubescent. *Corolla* lobes spreading, glandular. *Fruit* depressed, globose, ·25 in. across.

LAKHIMPUR, SIBSAGAR, DARRANG, GOALPARA, KHASI

11. Ardisia pedunculosa *Wall.*

A shrub up to 10 ft. high, with spreading branches; stem grey. *Leaves* 2-8·5 by ·6-2 in., narrow lanceolate to oblong-lanceolate, margins recurved, entire or very minutely serrulate, rather membranous; lateral nerves obscure, midrib depressed above, prominent beneath with a line of red dots along the margins and translucent bars all over; base cuneate; petiole ·1-·6 in. long. *Flowers* rosy pink about ·5 in. across, in axillary pedunculate racemed umbels or compound corymbs or at the ends of branchlets. *Inflorescence* often drooping; pedicels ·6-1 in. long, reddish, slender; peduncles 2-3 in. long, slender, quite glabrous; buds acute. *Calyx* segments ·12 in. long, spreading punctate, ovate-lanceolate, acute. *Corolla* lobes shortly connate, overlapping, twisted to the right in bud, ovate, sharply pointed, fleshy at base. *Style* as long as corolla lobes. *Ovary* glabrous, ovoid. *Fruit* depressed, globose, black, ·25 in. across. *Seeds* striate.

KHASI HILLS, up to 5,000 ft.

Flrs. 11. Fr. Cold season.

12. Ardisia quinquangularis *A. DC.*

Branches rather slender. *Leaves* about 7 by 1·5 in., broadly lanceolate, acute, entire, sub-membranous, opaque punctulate; base gradually acute; petiole ·6 in. long. *Flowers* in large terminal panicles. *Calyx* segments 5, pubesuent, ovate, rather acute, margins ciliate. *Corolla* lobes ·5 in. long. *Drupe* depressed, obtusely 5-angular, about ·2 in. across.

ASSAM (Clarke). KHASI HILLS, up to 4,000 ft. Mann's sheet No. 540.

Flrs. 5-6.

13. Ardisia Griffithii *C. B. Clarke.* Vern. *Dieng-soh-pi-kenneng,* Khasi; *Dieng-pylleng-dakha,* Synt.

A shrub up to 8 ft. high with simple grey stem; branches rather stout, spreading. *Leaves* 6-12 by 1·3-4 in., oblanceolate, ovate-oblong, entire, coriaceous, glabrous, acute, shining above, cinnamon colour beneath; lateral nerves

numerous, sub-parallel, very slender, transverse; petiole semi-circular in scales up to ·5 in. long. *Flowers* in large dense terminal panicles; bracts more or less persistent, elliptic-oblong, ·13 in. long; pedicels rusty pubescent, umbelled. *Calyx* pubescent; segments slightly connate at the base, oblong or rotundate, ciliate in the margin. *Fruit* black when fully ripe with pink juice, globose, vertically striated about ·25 in. across.

KHASI HILLS, 4,500 ft.
The flowers are said to be eaten, cooked and taste like fish.

Flrs. 4-6. Fr. Cold season.

14. Ardisia colorata *Roxb.* Vern. *Rulthlu,* Lushai; *Bol-simbal,* Garo; *Naltong,* Kuki.

A shrub or a small tree up to 25 ft. high; bark-grey, warty with minute vertical lenticels, green below the cuticle, ·25 in. thick; blaze light cream. *Leaves* 3·5-11 by ·8-3 in., oblong-lanceolate, entire, acute or bluntly acuminate, coriaceous, glabrous; lateral nerves about 20 on either half, almost at right angles to the midrib, sub-parallel, arcuate; midrib and nerves impressed above, prominent beneath; petiole channelled, ·3-·5 in. long; base of petiole decurrent on the stem. *Flowers* small, reddish white, in large terminal panicles; peduncles and branches flattened; pedicels umbelled. *Calyx* segments elliptic-oblong, punctate. *Corolla* lobes about ·1 in. long. *Style* much larger than the corolla lobes. *Fruit* bright pink, globose, ·2 in. across.

CACHAR, SIBSAGAR, LAKHIMPUR, KHASI HILLS, GARO HILLS.
Wood reddish, mottled with brown streaks.

Flrs. 12-1. Fr. 4-5.

15. Ardisia paniculata *Roxb.* Vern. *Soh-Dannai-khyntew, Dieng-soh-botut,* Khasi; *Hanpharo,* Mik.

A large shrub; stem sipmle, fleshy. *Leaves* 6-14 by 2-5 in. (largest 18 by 4 in.), alternate on main stem, whorled or crowded at the ends of branchlets, oblanceolate, entire, acuminate, coriaceous, glabrous, shining above, pale and

punctulate beneath; lateral nerves 12-15 on either half, arcuate, impressed above, prominent beneath; midrib keeled; base decurrent into a short thick petiole. *Flowers* rosy or reddish in long stout almost glabrous, terminal panicles; branches more or less flattened and angular. *Calyx* segment small, round (not punctate). *Corolla* lobes ·16 in. long (not punctate). *Anthers* with red glandular dots. *Fruit* globose, ·2 in across, longitudinally ribbed.

KAMRUP, KHASI HILLS, ascending up to 2,000 ft.

Flrs. 4. Fr. 10.

16. Ardisia macrocarpa *Wall.*

A single stemmed shrub usually growing in shade or as an under-growth. *Leaves* 3-5·5 by ·8-1·2 in., lanceolate, acute crisply crenate, membranous, glabrous with a row of marginal dots; lateral nerves obscure; base narrowed into a short petiole ·1-·2 in. long. *Flowers* pinkish, fairly large in axillary peduncled umbels at the ends of branchlets, often in sub-terminal or terminal panicles; pedicels minutely rusty. *Calyx* segments about ·25 in. long, oblong. *Corolla* lobes acute. *Fruit* bright red dotted, ·3-·5 in. across.

KHASI HILLS, ascending up to 5,000 ft.

Flrs. 7. Fr. Cold weather.

17. Ardisia crispa *A. DC.* sp. A. crenata Roxb.

A small shrub; branches verrucose; bark brownish. *Leaves* 1·5-5·5 by ·5-1·3 in., elliptic-lanceolate or lanceolate acute or shortly acuminate, serrulate or crenulate, thinly chartaceous, glabrous, dark-green above, paler beneath with prominent dots scattered over the whole blade; petiole ·1-·2 in. long; lateral nerves 7-9 on either half, slender. *Flowers* small in simple or compound umbels often corymbose, subterminal or from old stem; pedicels slender, ·3 in. long. *Calyx* segments ovate, ·1 in. long, specked with orange dots. *Corolla* lobes ovate-acuminate, unequal, whitish with purplish orange dots. *Filaments* short; anthers large,

acute, punctate. *Ovary* ovoid. *Berries* purplish, ·15-·3 in. across.

KHASI HILLS, ascending up to 4,000 ft.

Flrs. 1-6. Fr. Cold season.

18. Ardisia virens *Kurz* Vern. *Soh-bumro,* Abor; *Sidum-asing,* Miri.

A small single stemmed shrub with spreading branches. *Leaves* 4-7 by 1·5-3 in., elliptic-oblong or oblong-lanceolate, crispy-crenulate, shortly acuminate, chartaceous, glabrous; lateral nerves numerous, slender, more or less parallel, midrib prominent beneath; tertiaries thin and very lax; base cuneate; petiole ·1-·3 in. long. *Flowers* medium, pinkish, showy, in umbels arranged in terminal or sub-terminal (ends of arrested apex of branches) glabrous corymbs; peduncle up to 1·75 in. long. *Calyx* segments herbaceous, elliptic-ovate, obtuse, speckled with black dots. *Corolla* lobes ·3 in. long, ovate, shortly acuminate, black-dotted. *Berries* size of a pea, globose, yellowish, smooth, speckled with prominent dark-purplish dots.

N.-E. Frontier, NAGA HILLS, KHASI HILLS.
The fruit is often strung up in rosary.

Flrs. 6-7. Fr. 12.

19. Ardisia odontophylla *Wall.*

A small shrub (3-6 ft. high). *Branches* semi-herbaceous; branchlets rusty, puberulous when young. *Leaves* 3·5-6·5 by 1·3-3 in., elliptic, sharply and finely serrate, acute, membranous, almost glabrous, somewhat puberulous on the midrib; lateral nerves about 14 on either half, sub-parallel, prominent; base acute; petiole up to 2 in. long. *Flowers* in simple or compound lax, few flowered racemes arising from the naked stem towards the apex of the branchlets; pedicels slender, ·2-·4 in. long; bracts linear, ·4 in. long; buds ·2 in. long. *Calyx* small, ovate; segments about ·2 in. long. *Fruit* globose, ·25 in. across, scarlet.

CACHAR, NAGA HILLS, Patkai mountains, K. & J. HILLS, ascending up to 4,000 ft.

Flrs. 6-7. Fr. 1.

5. SADIRIA Mez.

Shrubs or trees. *Inflorescence* axillary in rusty sessile umbels, racemes or corymbs. *Flowers* minute, hermaphrodite, 5-merous. *Calyx* ½ connate; segments hairy or ciliate or serrulate at the margins, punctate or lanceolate. *Corolla* tubular, cylindric or urceolate; lobes sub-symmetric, ovate or triangular, acute, scarcely emarginate, rather small. *Filaments* short. *Ovary* globose; style simple; stigma minutely punctate; placenta conical; ovules about 5, uniseriate. *Fruit* baccate, sub-globose; endocarp, crustaceous; albumen ruminate, horny; embryo cylindric, transverse, curved.

The genus Pimelandra according to the latest literature I can find on the subject *viz.* Index Kewensis and Das Pflanzen-reich has been now changed into *Sadiria* by Mez. The genus should therefore be called *Sadiria* Mez.

Sepals triangular, ovate, densely ciliate :—

Fruits perfectly globose. ..	..	1. *S. eugeniifolia.*
Fruits assymetric, ellipsoid. ..	..	2. *S. Griffithii.*
Sepals triangular, margins serrulate.	..	3. *S. Bourri.*
Sepals elliptic, remotely ciliate. ..	..	4. *S. erecta.*

1. Sadiria eugeniifolia (Wall) *Mez.*

A shrub or small tree; stem with zigzag horizontal spreading branchlets. *Leaves* 4-9 by 1·5-2·5 in., oblong-lanceolate, elliptic-oblong or obovate, crenate or distantly toothed, caudate-acuminate, thinly chartaceous, glabrous, scarcely hairy on the midrib beneath, conspicuously, gland-dotted beneath; lateral nerves about 12 on either half, arched, very prominent beneath; base acute or rhomboid; petiole ·2-·3 in. long. *Flowers* ·16 in. long, in short axillary rusty pubescent, corymbose or sub-simple racemes; bud ·12 in. long; pedicels hairy, ·12 in. long; bracts minute, caducous. *Calyx* segments ovate, sub-acute, hairy, outside reddish. *Corolla* campanulate; lobes assymetric, triangular. *Ovary* ovoid; stigma punctiform; ovules few in horizontal line on the conical placenta. *Berries* globose, bright red, ·2 in. across.

KHASI HILLS, 2-4,000 ft. Common.

Flrs. 4-5.

2. Sadiria Griffithii (*Clarke*) *Mez.*

An erect shrub; branches rusty puberulous at the ends. *Leaves* 7·5 by 2·5 in., elliptic or broadly lanceolate, acuminate, sub-entire, glabrous above, rusty villous on the midrib beneath; gland dots very minute; lateral nerves conspicuous; petiole ·4 in. long. *Inflorescence* corymbose, rusty pubescent. *Flowers* small. *Calyx* segments dorsally tomentose. *Corolla* lobes sub-symmetric, triangular, ovate, rotundate; anthers sub-sessile. *Ovary* ovoid; style simple; stigma punctiform. *Berry* red, globose, ·2 in. in across.

ASSAM (South East) Patkoi 4,000 ft.

(Griffith's No. 3598).

3. Sadiria Bourri *Dunn.*

A glabrous bushy shrub with slender branchlets. *Leaves* 4-5·5 in. long, ovate-acuminate, margins entire to undulate; glands red scattered about, specially near the margins; lateral nerves 12-13 on either side, prominent beneath; petioles usually ·6-2 in. long. *Flowers* in short cymes ·6-·8 in. long, aggregated and drooping from the leaf axils. *Calyx* segments 5, slightly connate at the base, triangular, margins serrulate, about ·05 in. long. *Corolla* contorted in bud; tube about double the length of lobes, which are oval and rather fleshy. *Stamens* 5, a little shorter than the corolla; filaments short, inserted towards the base of the corolla tube. *Ovary* globose; style slender, slightly exceeding the corolla; stigma punctate; ovules 5, uniseriate. *Fruits* not known.

Abor Hills-summit of Bapu.-Burkill.

4. Sadiria erecta (*clarke*) *Mez.*

A small shrub, erect; branches ferruginous-tomentose towards the ends. *Leaves* 3·5 by 1·5 in., narrow-elliptic or elliptic-oblong, shortly acuminate, more or less obscurely toothed or sub-entire, chartaceous, almost glabrous; lateral nerves not conspicuous, gland dots scattered; base cuneate or narrowed into the petiole ·4 in. long. *Inflorescence* fascicled on short spurs from the base of tufts of small bracts; pedicels about ·3 in. long. *Calyx* segments ·12 in., elliptic-

oblong. *Corolla* small; lobes rotundate. *Berry* ·25 in. across, globose.

KHASI & JAINTIA HILLS-3,000 ft. (Clarke No. 19384).

6. HYMENANDRA A. DC.

Hymenandra Wallichii *A. DC.*

A stout simple stemmed low shrub. *Leaves* almost sessile, 8-11·5 by 2·3-3·5 in., obovate-oblong, crenate-denate, membranous, glabrous, gland-dotted; lateral nerves slender, numerous, about 30-40 on either half more or less parallel, arched towards the margins. *Flowers* 5-merous, pinkish in subsessile compound, bracteate, umbels on lateral short branchlets (peduncles?); bract foliaceous (in mature form of the leaves) about 3 by ·7 in. long; pedicels about ·5 in. long, rusty pubescent. *Calyx* segments ovate-acute, punctate. *Corolla* lobes narrow-lanceolate, twisted, punctate. *Stamens* on the throat of the corolla; filaments short; anthers ovoid, connective united into a tube by membranous edges. *Ovary* globose; style filiform; stigma punctiform. *Seeds* solitary, globose; albumen wrinkled.

SYLHET, NAGA HILLS, KHASI HILLS, 3,000 ft., UPPER ASSAM, CACHAR.

Flrs. 4-6. Fr. Cold season.

7. AMBLYANTHUS A. DC.

Trees or shrubs, compound. *Leaves* alternate, petioled, margins glandular. *Flowers* bisexual, small, 5-merous; buds obtuse. *Calyx*-segments obconic, imbricate. *Corolla* lobes obovate, emarginate, contorted in bud. *Stamens* 5; filaments short; anthers ovate, connate by their edges, introrse, dehiscing inwards in slits. *Ovary* glabrous, ovoid or ellipsoid; style elongate; stigma small, discord; ovules on a *globose* placenta. *Fruit* globose; endocarp crustaceous; albumen ruminated; embryo elongate; cylindric, transverse.

Inflorescence umbellate at the ends of branchlets :—		
Sepals connate up to the middle .	1.	*A. glandulosus.*
Sepals scarcely more than ⅓ connate.	2.	*A. prœtervisus.*
Inflorescence axillary or apparently lateral.	3.	*A. multiflorus.*

1. Amblyanthus glandulosus *Roxb. A. DC.*

A small shrub, glabrous. *Leaves* 2·5-8·5 by ·7-2·5 in., narrow-lanceolate, shortly acuminate, shallowy crenate or slightly dentate, often glandular toothed, membranous, glabrous with raised dots beneath, often a belt of dots along the margins; lateral nerves slender, numerous; midrib more prominent beneath; base acute or cuneate, sometimes oblique; petiole ·2-·6 in. long. *Flowers* small on a umbellate panicle arising from the terminus of naked branchlets; peduncles slender, 1-2 in. long; pedicels short. *Buds* obtuse. *Calyx* segments ·06 in. long, triangular, punctate acute. *Corolla* ·8-·1 in. long; lobes obovate, emarginate, punctate, recurved in flower. *Anthers* connate by their edges into a tube. *Ovules* 3-4 in one line on the globose placenta. *Fruit* globose, ·25 in. across, obscurely striate.

SYLHET, KHASI HILLS, ascending up to 3,000 ft.

Flrs. 7. Fr. 11-12.

2. Amblyanthus prœtervisus *Mez.* n. sp.

Branches slender, glabrous. *Leaves* about 5·5 by 1·5 in., broadly lanceolate, amucinate, glandular toothed, thinly membranous, glabrous. *Inflorescence* appearing to be composite but actually umbellate, shortly pedunculate; rachis few flowered, glabrous. *Calyx* scarcely more than ⅓ connate the middle. *Berry* globose, about ·3 in. across.

KHASI HILLS, (Hk. f. & T)

3. Amblyanthus multiflorus *Mez.* n. sp.

Branches rather thick, glabrous. *Leaves* about 7 by 1·75 in., broadly lanceolate-elongate, acuminate-undulate, crenate, thinly membranous. *Inflorescence* paniculate, axillary or apparently lateral. *Calyx* and corolla about ⅓ connate.

ASSAM, (Griffith No. 3564).

8. ANTISTROPHE A. DC.

Antistrophe oxyantha *A. DC.*=Ardisia oxyantha Wall.

Single stemmed shrub with horizontal spreading branches; stem whitish. *Leaves* 3-7 by 1-2 in., oblong or oblong-

lanceolate, tapering into a blunt tail, entire, thinly chartaceous or membranous, glabrous, often with raised black dots above; lateral nerves 10-14 on either half, arched, more prominent below; base cuneate; petiole ·25-·8 in. long. *Flower* buds long, narrowed into a beak. *Calyx* segments puberulous, lanceolate, persistent, gland-dotted. *Corolla* lobes twisted, overlapping to the left, gland-dotted. *Filaments* short; anthers free, opening longitudinally, connective produced upwards in a membranous wing. *Ovary* ovoid; style filiform; stigma punctiform. *Fruit* globose, ·25-·3 in. across. *Seeds* solitary; albumen ruminate; embryo transverse.

LUSHAI HILLS, SYLHET, GARO HILLS, ascending up to 4,000 ft.

Flrs. and Fr. throughout the year. Fr. Chiefly 4-6.

(This is Ardisia oxyantha Wall. Cat. (1830) No. 2275).

9. AMBLYANTHOPSIS Mez.

Amblyanthopsis membranacea *Mez.*

A small shrub; branches graceful flower bearing, often pubescent. *Leaves* 4 by 1-2 in., lanceolate or oblong-lanceolate, acuminate, coarsely and crisply crenate, membranous, glabrous, gland-dotted; nerves prominent; base acute; petiole ·25 in. long. *Inflorescence* few flowered, simple, sub-corymbose, pendulous or nodding; pedicels ·12-·15 in. long. *Flowers* ·08-·2 in. long, glabrous. *Calyx* segments ovate, elongate, connate, membranous, punctate. *Corolla* lobes large, sub-orbicular, depressed irregularly, undulate, emarginate, punctate. *Anthers* free; filaments linear-long, flattened, small, ovate. *Ovary* small, ellipsoid-club-shaped, gland-dotted; style long, fleshy, cylindrical; stigma broadly truncate. *Fruit* globose, black, not striate. *Seeds* large, very few.

SYLHET, CACHAR, KHASI HILLS.

Flrs. 6.

FAM. 81. SAPOTACEÆ.

Trees or shrubs, generally evergreen, often with yellowish milky juice; young parts usually rusty tomentose. *Leaves* entire, usually alternate, coriaceous, petiolate, generally exstipulate or stipules very caducous. *Flowers* hermaphrodite, axillary, pedicellate, clustered, rarely solitary or panicled. *Bracts* or bracteoles 0 or minute. *Calyx* inferior, persistent; segments 4-8, imbricate or biseriate and outer series valvate. *Corolla* tube short; lobes as many or 2-4 times as many as the calyx-segments. *Stamens* on the corolla tube as many as the corolla lobes, epipetalous or 2-3 times as many, 1-3 seriate; filaments short; anthers oblong-lanceolate, connectives often produced; staminodes alternate with the stamens. *Ovary* superior, sessile, 2-8 celled (11-12—Brandis); style subulate; stigma usually punctiform; ovules solitary in each cell, attached to the inner angle (anatropous). *Fruit* 1-8 seeded, baccate. *Seeds* ellipsoid or compressed; hilum conspicuous; testa usually crustaceous; exalbuminous with large fleshy cotyledons or albuminous with flat cotyledons; radicle inferior.

Calyx segments 1-seriate, imbricate; stamens 5-6:—		
Staminodes 0. Main secondary nerves of leaves close parallel.	1.	**Chrysophyllum.**
Staminodes alternating with stamens, nerves distant, conspicuous.	2.	**Sideroxylon.**
Staminodes present; flowers panicled. ..	3.	**Sarcosperma.**
Calyx segments biseriate, outer ones valvate:—		
Calyx segments 4 :—		
Seeds albuminous. Stamens 12 or more.	4.	**Madhuca.**
Calyx segments 6-8 :—		
Staminodes 0. Seeds exalbuminous.	5.	**Palaquium.**
Staminodes 6 or 8. Seed albuminous.	6.	**Mimusops.**

1. CHRYSOPHYLLUM Linn.

Chrysophyllum Roxburghii *G. Don.* Modern name Donella Roxburghii (G. Don.) Purre. Cf. Parker in I. F.

1931: 490. Vern. *Bonpitha,* Ass.; *Thaibon-buphang,* Kach.; *Theipabon,* Kuki.

An evergreen tree (70′/118″) exuding milky juice; young parts rusty or tawny pubescent with very dark foliage. *Bark* ash grey and somewhat rough outside, reddish below the cork, very light brown soft and somewhat gummy inside. *Leaves* exstipulate, distichously spreading, 2·5 by 1·2 in., oblong-lanceolate or elliptic-oblong, caudate or abruptly acuminate, shining, glabrous; lateral nerves very numerous, close with fine intermediate ones, sub-parallel, conspicuous, uniting within the margin; base cuneate, rounded, often unequal sided; petiole short, ·1-·2 in. long. *Flowers* small, shortly pedicellate, about ·2 in. in dense axillary capitate clusters. *Calyx* 5-partite; segments sub-equal, obtuse, imbricate, rusty-fugacious pubscent. *Corolla* campanulate, 5-lobed (rarely 6); lobes imbricate in bud, ciliate. *Stamens* united in the corolla-tube; filaments linear; anthers included, dehiscence sublateral or introrse; staminodes 0. *Ovary* 5-6-celled, villous; style glabrous; stigma 5-lobed. *Berry* rusty tomentose when young, yellow and soft when ripe, obscurely 5-6 ridged, globose, about 1·5 in. across. *Seeds* 5-6, compressed, ellipsoid; testa coriaceous; hilum elongate; albumen fleshy; cotyledons flat.

LAKHIMPUR, NOWGONG, CACHAR, SYLHET, N. C. HILLS, GOALPARA, KHASI & JAINTIA HILLS, ascending up to 3,000 ft.

The fruit is edible. Wood white, close grained, moderately hard, pores small in radial lines; med. rays numerous, very fine (Gamble). Weight 36 lbs. P=476 (Bourdillon). The wood may be used for building purposes.

Flrs. 4-5. Fr. Cold season.

2. SIDEROXYLON Linn.

Trees (rarely shrub). *Stipules* 0. *Flowers* small in axillary fascicles; pedicels pubescent, villous or tomentose. *Calyx*-segments 5-6, imbricate. *Stamens* 5-6, opposite to corolla lobes and attached to the tube or at its base; fialments short or linear; anthers ovate or lanceolate; staminodes sometimes petaloid. *Ovary* usually villous, 5 or rarely fewer celled; style cylindric; stigma small; ovules usually solitary, rarely more. *Fruit* an ovoid or globose berry, 5 or fewer

seeded; albumen fleshy; cotyledons flat, foliaceous or almost fleshy.

Flowers large; corolla ·25 in. or more; filaments short; calyx segments blunt; buds obtuse :—
  Branchlets and under side of leaves rusty pubescent. .. .. 1. *S. Hookeri.*
  Branchlets glabrous, tips rusty villous. .. 2. *S. grandifolium.*
Flowers small, corolla less than ·16 in.; calyx segments acuminate; buds narrow, tips conical :—
  Branchlets villous :—
    Leaves crowded at the extremities of the thick branchlets. .. .. 3. *.S. assamicum.*

1. Sideroxylon Hookeri *Clarke.* Vern. *Dieng-soh-pho-shree,* Synt. (=Monkey's crab-apple).

Tree (35′ /42″). *Bark* dark-grey, softly corky, rather closely fissured; inside light red, ·12 in. thick; spines large only on branches, generally simple, exudes milky juice. *Ends* of branchlets rusty villous. *Leaves* 2-5 by 1-2 in., elliptic-lanceolate, subcoriaceous, rusty pubescent when young, soon becoming glabrescent or glabrous on maturity with a few hairs on the midrib underneath; lateral nerves prominent below, 11-13 on either half; base narrowed into the petiole ·3-·5 in. long. *Pedicels* villous. *Calyx*-segments blunt, silky. *Corolla* about ·3 in. long. *Anthers* exserted. *Staminodes* densely hairy. *Ovary* densely villous. *Fruit* oblong or ellipsoid, 2 by 1 in., one seeded, terminated by style (·5 in. long).

KHASI & JAINTIA HILLS, (R'song Forests—U. Kanjilal No. 6468).

Wood light, pale-brown, moderately hard, mottled in long section, takes a fine polish. Weight about 58 lbs. Should be used for building, construction and furniture.

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

2. Sideroxylon grandifolium *Wall.* Vern. *Rosintaito,* Kuki; *Thaipobuon, Korberu,* Lushai.

A large tree (90′/65″); stem buttressed. *Bark* grey, somewhat rough with very shallow fissures and horizontal

wrinkles about 1 in. thick, light dun inside, somewhat granular near the outer edge of the blaze, exuding white milk from the inner layer. *Leaves* crowded at ends of branches 5-10 by 2-4·5 in., obovate or oblanceolate, apex blunt, glabrous; lateral nerves 8-10 on either half, depressed above, prominent beneath; base cuneate; petiole up to 1·5 in. long, swollen at the base. *Flowers* small, greenish-white, sessile or sub-sessile, commonly on the old wood below the leaves in dense clusters on wart-like tubercles above the leaf-scars. *Calyx*-segments imbricate, blunt, nearly glabrous. *Corolla* longer than the calyx. *Filaments* short; staminodes whitish. *Fruit* almost sessile, globose or pyriform, about 3 by 2·5 in., exuding milk, 5 seeded, yellow when ripe.

LUSHAI HILLS, CACHAR, N. C. HILLS, KHASI & JAINTIA HILLS.

Flrs. 4-5. Fr. Cold season.

3. Sideroxylon assamicum *Clarke.* Vern. *Dieng-soh-manong-ksui,* Khasi.

Tree (40′/33″), stem very deeply and irregularly fluted, covered with stout compound spines, milky saps scanty. *Bark* greyish-brown outside; inside pinkish-white, rather soft, ·1 in. thick, somewhat sweetish and aromatic like liquorice. *Leaves* 2-9 by 1·5-2·7 in. with milky sap, broadly lanceolate or elliptic-acuminate, subcoriaceous, usually glabrous above, ferruginous floccose tomentose beneath, especially along the nerves; lateral nerves prominent beneath, 10-18 on either half; base cuneate or rhomboidal; petiole ·1-·5 in. long. *Flowers* dull-white in dense axillary clusters. *Calyx* lobes ovate, acuminate, inferior, villous outside. *Corolla* lobes acute, nearly glabrous. *Anthers* exserted; staminodes linear-lanceolate, hairy. *Berry* 1-2 seeded, superior, globose, oblong or ovoid, about 1-1·25 in. across; exocarp fleshy. *Seeds* dark-brownish or slaty, shining, compressed, somewhat pointed at both ends (·6 by ·3 in.) with an elongated hilum.

KAMRUP & KHASI HILLS.

Wood similar to S. Hookeri, but lighter. Cracks in seasoning.

Flrs. 4. Fr. 10.

3. SARCOSPERMA Hook. f.

Evergreen trees. *Leaves* coriaceous, sub-opposite; stipules caducous. *Flowers* small, 5-merous, clustered on the branches of a simple or compound axillary panicle; bracteoles minute. *Calyx* segments sub-equal, orbicular, fully imbricate. *Corolla* tube short; lobes round, imbricate. *Stamens* on the corolla tube; filaments short; anthers obtuse, oblong; staminodes 5, alternating with the stamens. *Ovary* 1-2 celled, glabrous; style cylindric; ovules ascending. *Berry* ellipsoid, 1-2-seeded; testa crustaceous, exalbuminous; hilum nearly basal; cotyledons fleshy.

Panicles and calyx pubescent. Leaves about 9 by 2 in., gland pitted at the nerve axils. ..	1. *S. arboreum.*
Panicles and calyx glabrous. Leaves about 5 by 1·2 in., not gland pitted at the nerve axils.	2. *S. Griffithii.*

1. Sarcosperma arboreum *Benth.* Vern. *Thirkal-wang, Dumuk-nachil* (Goat's ears), *Bol-subok,* Garo; *Dieng-thelaudi, U-soh-sarloh,* Khasi.

A large tree (80′/12″) with spreading crown. *Bark* greenish-grey, softly corky, slightly reticulately furrowed; inside fibrous, light brown, exuding white juice; blaze light red. *Leaves* almost opposite, very rarely alternate, bifarious, 3-10 by 1-3 in., narrowly oblong-lanceolate, acuminate, glabrous, gland pitted at the nerve axils; lateral nerves prominent below, 8-10 on either half, tertiaries prominent, transverse to midrib, sub-parallel; petiole ·2-·7 in. long. *Flowers* fragrant (like Mimusops Elengi), ·17-·25 in. across, yellowish or pale white, densely clustered in axillary or supra-axillary pubescent panicles. *Calyx* pubescent outside, segments persistent, deflexed in fruit. *Stamens* opposite to corolla lobes; staminodes obscure. *Fruit* with a glaucous bloom, gives out milky juice when cut, size of fruits varying according to its being 1-seeded or 2-seeded.

GARO HILLS, N.-E. F. TRACT, GOALPARA, N. C. HILLS, SIBSAGAR, SYLHET, KHASI & JAINTIA HILLS up to 4,000 ft.

Wood pinkish, moderately hard, pores moderate sized; med. rays very numerous, fine, equidistant, concentric lines indistinct. Weight

30 lbs. per c. ft., may be used for building, construction and making dug-outs.

Flrs. 12-2. Fr. 6-7.

2. Sarcosperma Griffithii *Benth.*. Vern. *Dieng-tyrbu-ladeu, Dieng-nting-jalasao,* Khasi; *Dieng-ja-lyt-pai,, Dieng-kymbu-blang,* Synt.

Tree (45′/30″). *Bark* brownish-grey, covered with soft spongy cork with very flat lenticels, soft light pinkish inside, exuding copious milky sap. *Branchlets* green, spines large, only on branches, generally simple; blaze light red; all parts including calyx and inflorescence glabrous. *Leaves* almost opposite, 4-7 by 1-1·8 in., lanceolate to elliptic-lanceolate; lateral nerves 6-10 on either half, arcuate, no gland pits at the axils, tertiaries transverse to the midrib; petiole ·2-·5 in. long. *Flowers* ·3 in. across, light dun-white, scented, more or less whorled on a short axillary glabrous raceme, which is sometimes panicled near base. *Calyx* divided nearly to the base, glabrous; segments more or less ciliate. *Corolla* lobes broadly obovate. *Stamens* inserted opposite the corolla lobes; staminodes alternating with corolla lobes. *Ovary* usually 2-celled; style subulate with minute protuberances towards the apex. *Fruit* about 1 in. long, oblong, reddish brown when fully ripe (with 2 large seeds, transversely plano-convex or one oblong and conforming to the fruit), brown, smooth, fleshy-grey, sweetish.

NOWGONG, KHASI HILLS, up to 5,000 ft.

Flrs. 11-12. Fr. 4-7.

4. MADHUCA Linn. (Bassia Linn.).

Madhuca butyraceoides *Scott.* Modern name Manilkara hexandra (Roxb.) Dubard.

A middle sized tree. *Leaves* clustered towards the ends of branchlets, 6-10 by 2-3·5 in., elliptic-oblong or obovate-oblong, glabrous, chartaceous; lateral nerves 23-25 on either half, sub-parallel, slightly arcuate at the margin, tertiaries not very conspicuous; base narrowed into the petiole, unequal sided, oblique; petiole up to 1·8 in. long; stipules caducous. *Flowers* pale-yellow, clustered near the tops of the branches,

axillary or from the scar of the fallen leaves. *Calyx* segments 5-6, imbricate; tube very fleshy, rusty tomentose. *Corolla* tomentose; lobes up to 16, reflexed, not fleshy. *Stamens* 70-80; filaments first connate into bundles of 6 then into larger bundles, ultimately forming a more or less continuous ring, floccose not glabrous. *Ovary* glabrous; style glabrous, long exserted. *Fruit* a berry; albumen 0.

N.-E. F. TRACT (Nizamghat No. 3137, U. Kanjilal) up to 1,200 ft.

Flrs. 10-12. Fr. 2.

The plant was first discovered by the late Rai Bahadur U. N. Kanjilal in 1913 in Sadiya Frontier Tract and he considered it a new species of Bassia (Madhuca).

5. PALAQUIUM Blanco. (Isonandra)

Trees with milky juice. *Leaves* usually coriaceous, petiolate, often minutely rusty tomentose beneath. *Flowers* 6-merous, pedicellate, fascicled in the axils of leaves or of the scars of fallen leaves. *Calyx* segments in two series, the outer 3 valvate, the inner imbricate. *Corolla* lobes 6, imbricate or contorted in bud. *Stamens* 12-18, attached to the base of the corolla, 1 seriate or the attenuate row inserted higher up; anthers lanceolate, extrorse or with lateral dehiscence; connective produced beyond the cells, acute or bifid; staminodes 0. *Ovary* villous, 6-celled; style linear. *Fruit* fleshy, ovoid or ellipsoid, 1-2 seeded. *Seeds* exalbuminous; testa crustaceous; cotyledons large, fleshy.

Leaves dun-felted beneath, glabrescent when mature. Fruit obovoid. Flowers in axillary fascicles.	1. *P. polyanthum.*
Leaves entirely glabrous. Fruit globose. Flower clusters, as a rule, from above the scar of fallen leaves.	2. *P. obovatum.*

1. Palaquium polyanthum *Benth.* Vern. *Kurta*, Sylh. & Cach. *Kherual*, Lushai & Kuki; *Bonthai pionbuphang*, Kach.; *Kerbal*, Tipp.; *Dieng-horua*, Khasi; *Salua*, Garo.

A large tree. *Bark* dark-brown with horizontal patches of greenish-white ·2-·3 in. thick, inside dull white with

streaks of light red exuding milky juice. *Brnachlets* thin, horizontal. *Leaves* 4-9 by 2-3 in., crowded at ends of branchlets, ovate-oblong, bluntly acute or obtuse, dun-felted beneath, glabrescent on maturity; lateral nerves numerous, not very conspicuous, sub-parallel; base cuneate; petiole up to 1·5 in. long. *Flowers* fragrant, in axillary fascicles; pedicels 1·5 in. *Calyx*-segments ·3 in. long. *Corolla* cream coloured, a little larger than the calyx. *Stamens* 12, occasionally more. *Berry* 1·5 in., obovoid, velvety brown, 1-seeded.

CACHAR, SYLHET, GARO HILLS, K. & J. HILLS.
Wood reddish hard, pores moderate sized in wavy radial lines; med. rays very fine, not prominent (Gamble). Weight 53 lbs. per c. ft. Much prized in Surma Valley as a timber for all general purposes. Said to yield a quality of *Gutta Percha.* Kernel of fruit eaten by monkeys.

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

2. Palaquium obovatum *Clarke.* Vern. *Kathulua,* Ass.; *Daser-changne,* Duff.; *Wai-to-phang,* Kach.; *Bakri-lapre,* Nep.

A middle sized tree. *Bark* dark-brown, somewhat rough, green below epidermis, white inside but with close reticulated brown veins; young branchlets very tomentose. *Leaves* rather crowded near the ends of branchlets, 5-10 by 2-4 in., obovate, ovate-oblong or elliptic-obovate, acute, glabrescent above, glabrous beneath; midrib strong, channelled above: lateral nerves more conspicuous beneath, 10-12 on either half, more or less parallel, tertiaries obscure; base cuneate; petiole ·5-·7 in. long. *Flowers* in dense fascicles, axillary or above the scar of fallen leaves. *Calyx*-segments ovate. *Corolla* glabrous outside, more than twice the length of the calyx; lobes longer than the tube, lanceolate, blunt. *Stamens* exserted; anthers minutely villous; filaments glabrous; style twice the length of corolla. *Berry* ·7 in. across, globose.

SIBSAGAR, DARRANG, NOWGONG.
Yields an inferior kind of Gutta Percha (Brandis).
Old leaves turn yellow before falling.

Flrs. 5. Fr. 7.

P. Gutta *Burck* is the *Gutta Percha* tree.

6. MIMUSOPS Linn.

Mimusops Elengi *Roxb.* Vern. *Bakul,* Beng.; *Gokul,* Ass. *Boal,* Sylh.

A large tree generally smaller and handsome in cultivation; young parts rusty pubescent. *Bark* grey, fissured. *Leaves* 2·5-4 by 1·25-2 in., elliptic, acuminate, chartaceous, shining, glabrous; lateral nerves numerous not very conspicuous, perpendicular to the midrib, sub-parallel; base acute or rounded; petiole ·5-1 in. long. *Flowers* 8-merous (rarely 6), about 3 in. across, creamy white, fragrant, star-like, solitary or in fascicles. *Calyx* rarely in two rows (rarely 3+3). *Corolla* caducous, lobes usually 24 in two rows, all lanceolate and almost similar. *Stamens* 8; staminodes rather petaloid, membranous, fimbriate; anthers lanceolate, extrorse, apiculate. *Ovary* hirsute, 6-8 celled; style subulate. *Fruit* rather variable, usually globose, ovoid or ellipsoid, about 1 in. long, yellow orange. *Seeds* usually solitary, ovoid, compressed, slaty brown, shining.

Cultivated or escapes. KAMRUP, SIBSAGAR, CACHAR, SYLHET.

The caducous corollas which fall in showers are held sacred and are very much prized for garlands and a perfume is distilled from them. The bark is used in Indian medicine. An oil is obtained from the seeds. Ripe fruit is edible, it is also very astringent.

Wood dark red, close grained, very hard, strong and durable; pores small, med. rays very fine, very numerous, uniform and equidistant (Gamble). Used for building and other implements. Weight varies averaging about 60 lbs. P.=632 (Skinner).

Flrs. 4-6. Fr. Cold weather.

FAM. 82. EBENACEÆ.

Trees or shrubs. *Wood* usually hard, often with black heart wood; wood fibres have minute bordered pits. *Leaves* usually alternate or rarely subopposite or opposite, entire, coriaceous, exstipulate. *Flowers* regular, 3-7-merous, axillary, solitary or shortly cymose, usually diœcious, bracteate; pedicels articulate. *Calyx* inferior, gamosepalous, persistent, often accrescent in fruit. *Corolla* gamopetalous, contorted, less often imbricate or valvate, attached to the base of tube. *Stamens* in male flowers as many or 2-3 times as many as the corolla-lobes or many; filaments free or paired or variously grouped or connate; anthers narrow, basifixed, usually dehiscing longitudinally, rarely apically; connective often produced. *Stamens* in female flowers reduced to staminodes or absent. *Ovary* superior, sessile, 2-16-celled; ovules 1-2 in each, anatropous, pendulous; style 2-8, free or united below. *Fruit* baccate, coriaceous or fleshy. *Seeds* usually fewer than there were formerly ovules, compressed; testa thin; albumen copious, cartilaginous, often ruminate; embryo axile, straight or slightly curved; radicle superior.

Flowers 4-5-merous. Ovary 4-5 or 8-10-celled. **1. Diospyros.**
Flowers usually 3-merous. Ovary 3- or 6- celled. **2. Maba.**

1. DIOSPYROS Linn.

Trees, rarely shrubs. *Leaves* alternate or sometimes sub-opposite. *Flowers* commonly white, yellowish or green, 4-5-merous, rarely more or less diœcious, rarely polygamuos, axillary in cymes or old branches, specially the female usually solitary. *Calyx* usually deeply lobed, rarely truncate, the female often larger than the male. *Corolla* often woody in fruit, various, more or less pubescent outside, twisted to the right in bud. *Male flowers* with 4-many stamens (often 16) often in pairs; pistillode present. *Female flowers* with 0-16 staminodes. *Ovary* 4-5 or sometimes 8-10-celled; ovules usually solitary, rarely 2 in each cell; style

short with spreading or lobed; stigma (1-4). *Fruit* globose, ellipsoid, or ovoidconic, usually showing abortive cells; rind, coriaceous. *Seeds* compressed, immersed in soft or viscid pulp.

Female flowers usually solitary :—
  Calyx similar in both sexes. Stamens usually in pairs :—
    Male flowers in pedunculate cymes:—
      Corolla of male flowers, hirsute. Leaves membranous, more or less hairy. .. .. .. 1. *D. stricta.*
      Corolla of male flowers pubescent or glabrous outside. Leaves thinly chartaceous, tomentose. .. 2. *D. montana.*
      Corolla of male flowers glabrous :—
        Leaves membranous, softly pubescent. Stamens 16-24. .. 3. *D. Kaki.*
        Leaves coriaceous, glabrous. Stamens numerous (32-64). .. 4. *D. Embryopteris.*
        Leaves coriaceous, glabrous. .. 5. *D. Toposia.*
      Corolla of male flowers rusty-silky. Stamens 32, tomentose :—
        Leaves lanceolate, male flowers sessile. .. .. 6. *D. lanceæfolia.*
        Leaves ovate-oblong, male flowers pedicelled. .. .. .. 7. *D. undulata.*
Female flowers in many flowered cymes, usually from the old wood :—
  Corolla fleshy. Fruit large as an orange. 8. *D. ramiflora.*
Male flowers in small cymes or in clusters. Stamens about 16 :—
  Leaves lanceolate, 2-4 in. long, hairy or almost glabrous. Fruit ellipsoid. .. 9. *D. nigricans.*
  Leaves oblong or elliptic-oblong, 4-10 in., glabrous. Fruit sub-globose. .. .. 10. *D. variegata.*
Male and female flowers solitary: —
  Stamens 12, glabrous :—
    Leaves glabrous except the midrib. .. 11. *D. pilosula.*

1. Diospyros stricta *Roxb.*

A tall tree (50′); bark plain, blackish brown outside, dark chocolate brown inside; young parts softly tomentose. *Leaves* 1·5-4 by ·6-1·2 in., lanceolate or ovate-lanceolate, acuminate, membranous, dark green above, more or less hairy; main lateral nerves 5-8 on either half, inconspicuous; petiole ·2 in. long. *Flowers* 4-merous, semi-ovoid in small bracteate

cymes. *Calyx*-segments 4, broadly ovate, hardy outside. *Corolla*-lobes contorted about the middle; tube tapering upwards, hairy outside. *Stamens* in 2 series, usually the outer of 10 and inner of 4, the latter almost sessile. *Fruit* egg-shaped, about 1·5 by 1 in. with spinescent horny shell on a stout bracteate stalk·3-·4 in. long; albumen uniform.

KKHASI HILLS (Tharia-U. Kanjilal).

Flrs. 10-11. Fr. 3.

2. Diospyros montana *Roxb.*

A large shrub or middle-sized tree. *Branchlets* and young leaves softly tomentose. *Leaves* 2-4 by 1-1·5 in., ovate or oblong, acuminate, entire, thinly coriaceous, pubescent or glabrescent; lateral nerves very slender; petiole about ·2 in. long. *Flowers* white, 4-merous. *Male flowers* in bracteate 2-8 flowered cymes; peduncles short, velvety. *Calyx* 4-partite; segments obtuse, velvety. *Corolla* urceolate or campanulate. *Stamens* 16, female solitary, nodding on short pedicels, larger than male flowers. *Ovary* glabrous, 8-celled, 1 ovule in each cell. *Fruit* bitter, globose, ·5-1 in. across, yellow when ripe, supported by the accrescent foliaceous calyx segments; albumen uniform.

Plains of CACHAR (G. Mann's 252).
Fruits not edible.

Flrs. 3-4. Fr. 9-11.

(This form appeared to be D. Kanjilali *Duthie* as described in Ind. For XXXI, page 307).

3. Diospyros Kaki *Linn.* Vern. *Dieng-iong*, Khasi; *Soh-tang-jong*, Synt.; *Halwa-tendu*, Hind.

A tree (55′/35″). *Bark* dark or greyish brown, corky, rough with exfoliating scales (young trees with reticulately furrowed black bark) thin, cinnamon or reddish inside, turning yellow. *Leaves* bifarious, 3-5 by 1-2 in., oblanceolate, obovate or ovate, bluntly acuminate, chartaceous, glabrous, rugulose above, pubescent beneath; lateral nerves 6-8 on either half, very oblique, slightly arched, sunk above, prominent beneath; tertiary nerves very delicately reticulated;

base narrowed into the petiole; petiole up to ·3 in long. *Male flowers* small, shortly pedicellate in small cymose clusters. *Calyx* deeply 4-cleft; stamens pilose, 16-24. *Female flowers* solitary. *Calyx* shaggy outside, about 1 in. across in fruit. *Corolla*-tube glabrate; lobes pubescent outside. *Staminodes* 8. *Ovary* 8-celled. *Fruit* shining or with a bloom, globose, 2-2·5 in. across, orange red or yellow when ripe, 3-8-seeded. *Seeds* flat; albumen uniform.

NAGA HILLS, KHASI HILLS, also cultivated.
Wood yellowish. Fruits edible.

Flrs. 3-5. Fr. 7-9.

4. Diospyros Embryopteris *Pers.* Modern name Diospyros Peregrina Gurke. *Vern. Gab*, Beng.; *Kendu*, Ass.; *Kendu-arong*, Mik.

A middle-sized handsome evergreen tree with short trunk and spreading crown. *Bark* blackish with numerous white blotches; inside deep red, fibrous; leaf buds silky; young leaves bright crimson. *Leaves* distichous, 4-8 by 1·3-2·5 in., oblong or narrowly oblong, subacute or obtuse, coriaceous, glossy green, smooth, glabrous; lateral nerves slender, obliquely ascending, rather inconspicuous; base rounded; petiole often twisted, ·3-·5 in. long. *Flowers* tetramerous, white or cream coloured, scented. *Male flowers* in short pedunculate rusty pubescent cymes of 2-7 flowers; peduncles ·3-·5 in. long. *Calyx* ·25 in. long, silky pubescent; segments 4, broadly ovate, pubescent within, margins ciliate. *Corolla* ·3-·4 in., broadly tubular; lobes fleshy, rounded. *Stamens* many in pairs at the base of the corolla; anthers linear, hairy up to the middle. *Female flowers* usually solitary (or up to 5), subsessile, larger than the male flowers; peduncles pubescent, stout. *Calyx* pubescent outside, deeply divided; segments broadly ovate, subcordate. *Corolla* campanulate; lobes cordate, obtuse, reflexed; staminodes up to 12. *Ovary* 8-celled; style 4-lobed at the tips. *Fruit* globose, 1·5-2·5 in. across, covered with a deciduous ferruginous scurf, turning yellowish when ripe, supported on the much enlarged accrescent calyx. *Seeds* up to 8, compressed, imbedded in a glutinous pulp; albumen smooth.

KAMRUP, NOWGONG also cultivated.

Wood white, moderately hard and close grained, used for building. The pulp of the unripe fruit is very viscid and is used for caulking country boats. An infusion of the pulp is used for dyeing fishing nets and rendering them more durable. The bark and seeds have astringent properties and are used in Indian medicine. The oil extracted from the seeds is also used in Indian medicine.

The ripe fruits are edible, but are too astringent to be palatable.

Flrs. 5-7. Fr. 4-5.

5. Diospyros Toposia *Ham.* Vern. *Gulal,* Cach. and Sylh.; *Thing-hang, makhang,* Lush.; *Thing-bong;* Kuki; *Ponsagusum-baphang,* Kach.; *Theipand-kop,* Tipp.; *Kala-khura,* Sylh.; *Kadeng-jong,* Mik.; *Bolgisim,* Garo; *Dieng-soh-seit-lang-kait,* Khasi.

A large or middle-sized evergreen tree (40′/32″). *Bark* black but with horizontal wrinkles; inside fibrous, ·2-·3 in. thick, reddish brown but turning darker, all parts glabrous. *Leaves* bifarious, alternate, 3-10 by 2-3·5 in., elliptic, elliptic-oblong or lanceolate, ovate-oblong, shortly or bluntly acuminate or obtuse, coriaceous, entire, shining, glossy, glabrous; midrib slightly depressed above, prominent beneath; lateral nerves 8-10 on either half, more or less oblique, zig-zagged, finely and elegantly reticulately veined; base obtuse or almost rounded; petiole ·3-·6 in. long. *Flowers* white, usually 4-merous; male flowers in axillary short lax pedunculate cymes; female (hermophrodite ?) solitary or sub-solitary, usually short and thickly peduncled; buds globose, minutely tubercled. *Calyx* connate in bud, afterwards irregularly 3-4 cleft, spathaceous, similar in male and female flowers; segments recurved in fruit. *Corolla* 4-5-lobed. *Stamens* about 32, glabrous. *Ovary* 4-celled, hairy (rarely 6); stigma 4, sessile. *Fruit* globose, 1·25 in. across, glabrous or glabrescent, usually solitary, very shortly stalked, 3-4-seeded, golden yellow when ripe; albumen uniform.

SYLHET, CACHAR, LUSHAI HILLS, N. C. HILLS, KAMRUP, GARO HILLS, K. & J. HILLS.

Flrs. 4-5. Fr. 12-2.

6. Diospyros lanceæfolia *Roxb.* Vern. *Sateru, Chhotro-arong,* Mik.; *Dieng-soh-leu,* Khasi; *Kendu,* Ass.; *Tezu,* Nep.; *Dieng-thang,* Synt.

A middle-sized evergreen tree (50′/48″); young shoots pubescent; branchlets and bark with peculiar pungent smell. *Bark* blackish rough with more or less parallel vertical fissures ·3-·5 in. apart, dark chocolate underneath the outer dead bark; inside light rosy pink with edges of white tissue from the depressions of the fissures on the surface; living portion ·17 in. thick. *Leaves* 2-farious, 2-8 by 1-3 in., narrow-elliptic or lanceolate to oblong-acuminate, glabrous, shining above, midrib depressed above, conspicuous beneath; lateral nerves slender, inconspicuous, about 16 on either half, wavy; tertiary nerves transverse to midrib, finely reticulate into elliptic masses whose longer axis are transverse to the midrib; base more or less rounded; petiole ·2-·6 in. long. *Flowers* 4-5-merous, sessile; male flowers sessile, clustered; female flowers solitary, sub-sessile in axils of fallen leaves. *Calyx* dissimilar in male and female flowers, 4-5-cleft; segments sharply recurved, rusty-tomentose. *Corolla* rusty and silky, ·3-·5 in. *Stamens* 16 in pairs; filaments hairy, number of stamens reduced in male flowers. *Ovary* 8-celled, hairy. *Fruit* subglobose or ovoid, astringent, ·75-1 in. across, rusty villous, especially when young, supported by the spreading accrescent calyx. *Seeds* up to 7, generally 3.

Wood yellow. It appears that ebony is formed in the species. Fruits are eaten by Nepalese.

SIBSAGAR, NOWGONG, KAMRUP, SYLHET, KHASI HILLS.

Flrs. 4-5. Fr. 12-2.

7. Diospyros undulata *Wall.*

Evergreen tree (80′/96″); branches drooping. *Bark* dark brown, almost black, rough with fissures and irregular scales; inside mottled with rather irreguarly scattered yellow strands ·25-·3 in. thick; young leaves reddish brown. *Leaves* alternate, 2-farious, 2-8 by 1·5-3 in., narrow-elliptic or lanceolate, entire, acute or acuminate, glabrous above, minutely punctate; midrib depressed above; lateral nerves slender, inconspicuous; base rounded; petiole ·3 in. long. *Flowers*

axillary, 4-merous, tomentose, solitary. *Male flowers* solitary, pedicelled, in short bracteate tomentose cymes. *Calyx* cup-shaped; segments triangular, hirsute on both sides. *Corolla* ·3-·5 in. long, sub-glabrous without; anthers in pairs 10-14, pistillode rudimentary, hairy;. *Fruit* globose, 1-1·5 in. long, truncate at the apex, villous, supported by the thickened woody calyx.

K. & J. HILLS.

Flrs. 2-3. Fr. 5.

8. Diospyros ramiflora *Roxb.*

Large tree. *Leaves* 4-8 by 1·5-3 in., oblong-elliptic or lanceolate, acuminate, thinly coriaceous, glabrous; lateral nerves 7-10 on either half, very slender, arched, tertiaries horizontal, parallel, very close; base cuneate; petiole ·3-·5 in. long, flattened above. *Male flowers* in cymose fascicles. *Calyx* campanulate, hairy outside, about ·2 in. long; segments elliptic, longer than the tube. *Female flowers* in many flowered cymes much longer than the male cymes. *Calyx* 5-cleft, nearly half way down. *Corolla* tubular, villous outside. *Stamens* 16, glabrous; staminodes 8-12. *Ovary* hairy, 8-12-celled; stigma 4-6 lobed. *Fruit* globose, glabrous, 2-3 in. across with accrescent calyx 1·5 in. across.

KHASI HILLS (Wallich).
(No specimen in Forest Herbarium, Shillong).

Flrs. 3-4.

9. Diospyros nigricans *Wall.* Vern. *Rangkoli,* Ass.

Tree (30′/32″) with spreading crown. *Branchlets* grey pubescent; bark blackish brown, greyish white inside, ·1-·12 in. thick; cambium soon turning greenish black; old leaves become yellow and leaves dry blackish. *Leaves* alternate, 2-farious, 1·5-4 by 1-2 in., lanceolate or elliptic lanceolate, bluntly acuminate, subcoriaceous, glabrous, midrib prominent beneath; lateral nerves about 12 on either half, slender, inconspicuous, oblique; base rounded or cuneate; petiole pubescent, ·1-·2 in. long. *Male flowers*—calyx deeply 4-fid; segments ovate, subacute, ·2 in. long, pilose outside,

margins ciliate, specially towards the apex. *Corolla* about ·3 in., deeply 4-lobed; pistillode pubescent, small. *Calyx*-segments ovate, blackish, coriaceous, thinly pilose outside, divided nearly to the base in fruit. *Female flowers*—lobes 4, overlapping to the right. *Fruit* solitary, sub-sessile, ellipsoid, glabrous, 4-celled.

SYLHET, CACHAR, SIBSAGAR, KAMRUP, LAKHIMPUR, N. C. HILLS.

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

10. Diospyros variegata *Kurz.* Vern. *Salkuli, Kolonthi, Koliori, Koilothi, Gab,* Ass., *Kadeng-jong-arong, Kading-iong, Kolti-arong,* Mik.; *Kalikath,* Nep.; *Ponsa-kisim-bophang,* Kach.; *Bolgisem,* Garo.

A large tree (80′/96″); branchlets glabrous; stem fluted. *Bark* blackish having deep vertical furrows exfoliating in pieces, exposing similarly coloured surface, ·25 in. thick; blaze white turning brown. *Leaves* 4-10 by 2-4·5 in., elliptic-oblong or oblong-lanceolate, unequal sided, occasionally acute or acuminate, coriaceous, glabrous; lateral nerves conspicuous, oblique, 9-11 on either half, reticulation of nerves conspicuous on both sides; base cuneate or acute; petiole ·3-·6 in. long. *Male flowers* yellowish white in cymose clusters of 2-8, ·66 in. long. *Calyx* deeply 4-cleft. *Corolla* ·33 in. long, salver-shaped; lobes as long as tube, nearly glabrous, recurved. *Stamens* 16, unequal; filaments short; anthers glabrous, taper pointed, dehiscing by long lateral slits. *Fruit* solitary, sub-globose, up to 2 in. long.

LUSHAI HILLS, N. C. HILLS, KAMRUP, NOWGONG, SIBSAGAR, DARRANG, LAKHIMPUR, GARO HILLS, K. & J. HILLS.

Flrs. 4-5. Fr. Cold season.

11. Diospyros pilosula *Wall.* Vern. *Leng-poi-ching,* Naga.

A small tree (40′/33″). *Bark* blackish, smooth; inside reddish brown, fibrous, rather hard, somewhat granular, ·25 in. thick. *Leaves* bifarious, 1-5 by ·7-1·5 in., elliptic-

ovate, oblanceolate or linear, sub-coriaceous, hairy along midrib, otherwise glabrous, often shining underneath; lateral nerves very conspicuous, oblique; base cuneate; petiole ·15-·2 in. long. *Female* and *Male* flowers solitary on the stem below the leaves on grey shaggy peduncles; *Calyx* lobes divided almost to the base, lanceolate or linear, slightly longitudinally ribbed, hairy. *Corolla* lobes similar to the calyx segments but shorter, margins ciliate; style 2-partite; staminodes 4. *Ovary* 4-celled, densely hairy, cells 1-ovuled. *Fruit* globose, smooth and red, ·5-·6 in. in diameter.

N. C. HILLS, SYLHET, CACHAR, K. & J. HILLS.

Flrs. 1-3. Fr. 5-6.

D. discolor *Willd.*

A handsome tree. *Leaves* 5-10·5 by 2-4 in., oblong, bluntly acute, coriaceous, glabrous above, minutely punctate, silvery grey beneath along midrib; lateral nerves numerous, very slender and inconspicuous. *Male flowers* scented in short dense cymes. *Calyx* deeply 4-cleft. *Corolla* tubular, densely villous. *Stamens* 22-24, quite glabrous; anthers large; style 4 (Prain). *Fruit* large, ellipsoid, purplish red, velvety.

KAMRUP (cultivated).

Flrs. 4. Fr. Cold season.

D. grata *Wall.*

A tree. *Leaves* 3-7 by 1-2 in., alternate, oblong-lanceolate, entire, acuminate, coriaceous, glabrous; base rounded; petiole ·2-·3 in. long. *Fruit* globose, about 1·5 in. in diameter; fruiting calyx 5-fid. *Seed* 1·2 by ·8 in., oblong, compressed.

GARO HILLS, 3,500 ft. (No. 13979), identified in R. B. Garden, Sibpur as above from fruiting specimens.

Fr. (ripe) 6.

D. glandulosa *Lace.*

A tree; bark greyish-brown. *Leaves* alternate, 4·5 by 2·4 in., ovate-oblong, lanceolate or oblanceolate, obtuse or acute, characeous; lateral nerves 5-6 on either half, arcuate, anastomosing with the intermarginal nerves, impressed above, prominent beneath; base shortly cuneate or narrowed into the petiole; petiole ·4 in. long, densely brown-pubescent. *Flowers* male: in cymes of 3-6, pubescent; buds broadly ovoid; calyx ·25 in. long; segments 4, oval or triangular, acuminate; corolla urceolate, ·32 in. long; lobes contorted, emarginate; stamens about 25 or some-times less, some-times cuneate; interior anthers

sessile. *Flowers* female: solitary; calyx 4-fid; tube short; segment orbicular, pubescent; corolla urceolate, tube ·2 in. long; lobes ·4 in. long, similar to male flowers; staminodes 12, sessile; anthers linear, acute, villous; ovary densely brownish pubescent, 8 locular; style 4, villous; stigma bifid. *Fruit* 1 in. across, globose with accrescent persistent calyx.

(Kew Bulletin 1915-349).

2. MABA J. R. & G. Forst.

Maba cacharensis *Das et Kanjilal* Sp. Nov.

A small tree attaining 30-40 ft. in height. *Bark* black or dark brown, ·1 in. thick; young parts pilose with straight fuscous hairs. *Leaves* bifarious, often with a few diminutive ones towards the base of the branches 1·5-7 by ·3-2 in., oblong-lanceolate or lanceolate, acuminate, membranous, entire, ciliate, upper surface thinly and under surface more densely pilose, specially along the nerves; lateral nerves 7-14 on either half, subarcuate, prominent beneath; tertiaries fine, scalariform; base rounded; petiole short, pilose, ·05-·1 in. long; stipules 0. *Flowers* unisexual, diœcious, 3-merous. *Males* (buds only seen) in 9-12 flowered peduncled cymes from the axils of leaves; peduncles ·2-·4 in. long, slender. *Bracts* ·25-·4 in., linear to ovate-lanceolate, sub-persistent; bracteoles similar, but smaller. *Calyx* 3-fid; segments pilose outside, glabrous within, broad ovate; tube short. *Corolla* 3-partite to nearly the base, pilose on the back; segments broadly ovate, subequal. *Stamens* 6-9. *Female flowers* ·33 in. long, on stout 8-25 flowered racemes from old wood, which are fascicled, rarely solitary and ·8-1·8 in. long; rachis of inflorescence stout; bracts lanceolate-subulate, ·12-·2 in. long, sub-persistent; pedicels stout, ·1-·12 in. long and nearly as long as or slightly longer than broad, suborbicular or broad-ovate, acute. *Corolla* ·2 in. long, dull white, thinly pilose on the back, 3-lobed; segments ·1 in. across, recurved in mature flowers. *Staminodes* 3, ·1 in. long. *Ovary* densely pilose, 6-celled, ·17 in. long; stigma deeply 3-fid, somewhat laciniate. *Fruit* about 1·5 by 1·2 in., glabrous, ovoid with a short beak seated on the persistent but scarcely accrescent calyx.

ASSAM, CACHAR—Borail Reserve No. 5716 (U. N. Kanjilal), No. 10548 (A. Das), LAKHIMPUR—Dulong Reserve No. 3653 (U. N.

Kanjilal—Herb, Shillong), KHASI HILLS—Nongkhlaw 1150 m. C. B. Clarke No. 18115 (Herb. Royal Botanic Garden, Calcutta).

Flrs. Hot season. Fr. Rainy season.

M. nigrescens *Dalz.* Vern. *Theng-prangke-arong,* Mik.

A large shrub or small tree; young parts fulvous hairy. *Leaves* 1-2 in. long, elliptic-lanceolate, chartaceous; midrib and veins conspicuous. *Ovary* 3-celled. *Fruit* ellipsoid.

N. C. HILLS (No. 6796), only leaf specimens; identified in R. B. Garden, Sibpur as above.

FAM. 83. STYRACEÆ.

Trees or shrubs; stellate hairs and peltate scales are frequent. *Wood* fibres have bordered pits. *Leaves* alternate, simple, exstipulate. *Flowers* regular, hermaphrodite, 4-5-merous in axillary and terminal simple or compound racemes or spikes, rarely solitary; bracts small. *Calyx* persistent, campanulate, superior or inferior, toothed or truncate. *Corolla* free or connate, imbricate. *Stamens* 8-10 or numerous, adnate to the corolla with free or connate filaments; anthers dehiscing laterally. *Ovary* more or less inferior, 2-5-celled; style filiform; stigma small, capitate, entire or obscurely 3-lobed; ovules pendulous or erect 1 or few on the inner angle of each cell. *Fruit* drupaceous, usually 1- (sometimes 2- 3-) seeded. *Seeds* albuminous; radicle as long or longer than cotyledons; embryo straight or curved.

(Engler in Das Pflanzen-reich has split this in 2 families—Symplococeæ and Styraceæ.)

Stamens numerous in several rows. ..	**1. Symplocos.**
Stamens 10, uniseriate. Calyx free or slightly adnate to the ovary. Fruit ellipsoid or globose, seated on the cup-shaped calyx.	**2. Styrax.**
Stamens 10. Calyx-tube adnate to the ovary. Fruit ellipsoid, wholly inferior.	**3. Parastyrax.**

1. SYMPLOCOS Linn.

Trees or shrubs. *Leaves* alternate, simple, commonly turning yellowish when dry. *Flowers* hermaphrodite, regular, white or yellowish in axillary or terminal simple or compound racemes or spikes, sometimes reduced to a solitary flower; bracts solitary at the base of pedicels, early caducous; bracteoles 1-2 beneath the flower. *Calyx* superior, often enlarged in fruit; segments 5, imbricate. *Corolla* usually free or almost free (connate at base); lobes imbricate, 5 in one series or more in 2 series. *Stamens* usually numerous, several seriate, adnate to the corolla tube or the petals, often more or less distinctly pentadelphous; filaments filiform or flattened at the base; anthers short. *Ovary* inferior 3- (rarely 2- or 4-) celled; style usually filiform; stigma capitate, conspicuously lobed; ovules 2, pendulous from the inner angle of each cell. *Drupe* subglobose or ellipsoid crowned by the calyx segments, 1-3-seeded, stone woody. *Seeds* oblong; testa thin; albumen usually fleshy; embryo terete, straight or curved; cotyledon short.

Petals free or nearly so :—

Flowers in axillary fascicles. Leaves coriaceous. Calyx-rim nearly as wide as fruit. .. 1. *S. glomerata.*

Flowers in racemes :—

Flowers white or yellow :—

Leaves coriaceous :—

Fruit ovoid or cylindric less than 1 in. long, glabrous :—

Leaves more than 3 in. long. Stamens about 100; petiole ·25-·5 in. long. .. .. 2. *S. racemosa.*

Leaves 2·5-4 in. Stamens 30-40. Fruit ovoid; petiole ·4-·7 in. long. Racemes hirsute. .. .. 3. *S. Sumuntia.*

Leaves 2-4 in. Fruit more cylindric. Petiole ·9 in. long. Racemes sparsely hairy or glabrous. .. 4. *S. pyrifolia.*

Leaves 6-9 in., ferruginous tomentose, beneath. .. .. .. 5. *S. macrophylla.*

Leaves chartaceous :—

Racemes many flowered :—

Fruit ellipsoid or conical :—

Leaves 1·5-4 in., caudate acuminate. .. .. .. 6. *S. caudata.*

Leaves 3·5-7 in., obtuse or apiculate. .. .. .. 7. *S. ramosissima.*

Fruit cylindric :—
Leaves 5.7 in., almost entire. Fruit ·5 in. long; stamens about 80. .. .. .. 8. *S. grandiflora.*
Leaves 5-12 in., minutely toothed, membranous. Fruit ·6-·8 in. long, smooth. .. .. 9. *S. Hookeri.*
Leaves 6-10 in., glandular-serrate, coriaceous. Fruit ·6 in. long, rusty pubescent. .. .. 10. *S. Pealii.*

Spikes many flowered, hirsute :—
Fruit globose. Stamens 18-25. Fruit ·2 in. across. .. .. 11. *S. lancifolia.*
Spikes many flowered, pubescent. Fruit cylindrical, about ·1 in. across. .. .. .. 12. *S. khasiana.*

Racemes or spikes compound:—
Fruit globose or almost so:—
Flowers pedicelled. Ovary 2-celled. .. .. .. 13. *S. cratægoides.*
Flowers sessile:—
Leaves glagrous. Fruit ·3 in. in diam. Ovary 3-celled. .. 14. *S. spicata.*
Leaves rusty hairy beneath. Fruit ·16 in. across. .. 15. *S. ferruginea.*
Fruit cylindric, ellipsoid or conical:—
Stamens 10-25. Lateral nerves 5-8. Embryo curved. .. 16. *S. oxyphylla.*
Stamens many. Lateral nerves numerous, rather inconspicuous. Embryo straight. .. .. 17. *S. theæfolia.*

1. Symplocos glomerata *King.* ex *Gamble.* Vern. *Kynja-dieng-pic, Tew-dieng-pei-iong,* Khasi.

A shrub or a small tree (25′/15″). *Bark* blackish grey. plain; blaze white. *Leaves* 3-8 by 1-2 in., narrow-lanceolate, acuminate, glandular, serate, coriaceous, glabrous and shining on both surfaces, veins sunk above, conspicuous beneath; lateral nerves slender, about 12 on either half, joined by an intramarginal nerve; base tapering, cuneate; petiole ·2-·7 in. long, often glandular. *Flowers* yellowish, crowded in dense axillary fascicles; bracts ovate. *Calyx* rusty woolly outside; segments rotundate. *Corolla* twice the length of calyx;

stamens 25, twice the length of corolla. *Fruit* up to ·5 in., cylindric, obscurely 3-gonous, 1-seeded with calyx rim as wide as the drupe; embryo straight.

SIBSAGAR, K. & J. HILLS.

Flrs. 4-5. Fr. 7-8.

2. Symplocos racemosa *Roxb.*

A small tree with broad crown (50′/24″). *Bark* brownish-grey, rough; inside greenish white and brown mottled, fibrous, somewhat granular, ·5 in. thick. *Leaves* 3·5-6 by 1-2·5 in., oblong-elliptic or elliptic-lanceolate, serrulate, obscurely crenate or entire, acute, obtuse, acuminate, coriaceous, glossy glabrous, dark-green above; midrib slightly pilose; lateral nerves slender, inconspicuous, 5-8 on either half, obliquely curved; base cuneate or obtuse; petiole ·25-·5 in. *Flowers* white, turning yellowish, ·3-·5 in. across, in axillary pubescent, simple or compound racemes, each flower supported by 3 pubescent bracts, one at the base of the pedicel and 2 below the calyx; pedicels ·05-·15 in. *Calyx*-tube glabrous; segments oblong, ovate, puberulous. *Corolla* lobes obtuse, oval. *Stamens* numerous, unequal; anthers as broad as long with a very small connective. *Disc* epigynous, minutely pilose. *Drupe* 3-celled, oblong, glabrous, purplish-black when ripe, crowned by the persistent calyx; embryo straight.

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

Flrs. 10-12. Fr. 1-5.

3. Symplocos Sumuntia *Ham.*

A small tree. *Branchlets* terete, rather stout. *Leaves* 2·5-4 by 1-2 in., elliptic or oblong, bluntly acuminate, entire or irregularly dentate, coriaceous, glabrous; lateral nerves about 8 on either half, oblique, fairly straight; base cuneate; petiole ·4-·7 in. long, flattened above. *Flowers* sweet scented in axillary solitary few flowered racemes 1-2 in. long; rachis zigzag; buds ovoid; pedicels short, stout, rather elongated in fruit. *Calyx* segments about ·5 in. long, broadly deltoid, blunt, shorter than the tube. *Corolla* white; lobes about ·12 in. long, broadly ovate. *Stamens* 35-40, 5-adel-

phous. *Fruit* sublobose, about ·15 in. long; embryo straight.

KASHI HILLS, (Barpani)—Hooker.

Var. floribunda *Wall.*—Has larger and more densely set flowers wrich are very sweet scented, shorter racemes. *Calyx* lobes glabrous, tinged reddish. *Stamens* 5-adelphous.

KHASI HILLS (Shillong, Short Round).

Flrs. 3. Fr. Rainy season.

4. Symplocos pyrifolia *Wall.* Vern. *Dieng-mar khoit, Dieng-soh-rishang, Dieng-pe-lih, Dieng-pei-synrang, Dieng-ja-peh,* Khasi.

A small tree or shrub (25′/18″). *Bark* grey, ·25 in. thick, rough; blaze white mottled with brown. *Wood* cream-coloured. *Leaves* rigid, 2-4 by ·8-1·5 in., elliptic-lanceolate, acuminate, sub-entire or sparingly and distantly dentate, shining, entirely glabrous; lateral nerves about 6 on either half, impressed above, prominent beneath; petiole up to ·9 in. long. *Flowers* dull white, faintly scented (very like myrtle) in axillary finely pubescent racemes 1-1·5 in. long. *Calyx-limb* not produced beyond ovary; segments brown, strigose outside. *Corolla* sparingly silky hairy outside. *Stamens* numerous; filaments very slender, longer than the corolla lobes. *Disc* conspicuous. *Fruit* ellipsoid, ·5 by ·16 in., 1-3-seeded. *Seeds* cylindrical, somewhat oblique.

KHASI HILLS up to 5,000 ft.

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

5. Symplocos macrophylla *Wall.*

A small tree; branchlets densely ferruginous-tomentose. *Leaves* 6-9 by 2·5-4 in., elliptic or obovate-oblong, shortly acuminate, wavy at the margins, sub-coriaceous, shining above, ferruginous-tomentose beneath, especially along the nerves; lateral nerves about 12 on either hilf, arched, depressed above, prominent beneath; base rounded; petiole ·5-·7 in. long, stout, densely ferruginous-tomentose. *Spikes* 2 in. stout, densely rusty villous; bracts and bracteoles subsimilar, ·2 in. long, ovate, very hairy. *Calyx* tube ·06 in.

long, glabrescent; teeth ·1 in. long, ovate, closely hairy. *Corolla* lobes ·2 in., elliptic (Hooker).

(Flowers and fruit not seen).

(Only one specimen in Sibpur Herbarium without any flowers or fruit).

SYLHET (Wallich).

S. dryophila *Clarke.*

A tree; branchlets greyish, glabrous; young shoots slightly hairy; *Leaves* 3-5 by 1·2-1·7 in., oblong-elliptic or oblanceolate, entire-acuminate, coriaceous, glabrous; lateral nerves 8-12 on either half, faint; midrib depressed above, prominent beneath; base acute; petiole ·6-·9 in. long. *Flowers* in axillary racemes, 5-6 in. long. *Calyx* about ·2 in. long. *Fruit* globose, ·2 in. across; embryo slightly curved (Brandis).

NAGA HILLS, Kohima

Flrs. Rainy season.

6. Symplocos caudata *Wall.* Vern. *Dieng-marang-snah,* Khasi.

An evergreen shrub or a tree (up to 42′/60″) with an oval crown. *Bark* black, horizontally wrinkled; inside brownish yellow, granular; twigs dense. *Branchlets* dark purplish brown, smooth, coppices freely. *Leaves* 1·5-4 by ·5-1·2 in., lanceolate or elliptic-lanceolate, caudate-acuminate, more or less serrulate, sub-entire, shortly coriaceous, midrib impressed above; lateral nerves inconspicuous, about 7 on either half; base cuneate; petiole ·1-·3 in. long. *Flowers* white, (turning pale yellow) in axillary lax pubescent racemes, which are usually shorter than the leaves. *Calyx* glabrous; segments 5, ovate-oblong or ovate-lanceolate. *Corolla* lobes oblong. *Stamens* 25, exserted. *Ovary* glabrous. *Drupe* ellipsoid, ·3 in. long (5-celled ?—Kanjilal); embryo curved.

SIBSAGAR, K. & J. HILLS.

Flrs. 3-4. Fr. Cold season.

7. Symplocos ramosissima *Wall.*

A small tree or shrub. *Bark* dark brown, finely smooth; inside yellowish, tinged green. *Branchlets* glabrous. *Leaves* 3·5-7 by 1-1·75 in., oblong-lanceolate, serrulate, acuminate, chartaceous; lateral nerves 6-9 on either half; base cuneate; petiole ·25 in. long. *Flowers* whitish in lax axillary pedun-

culate pubescent racemes; bracts ovate, pubescent; pedicels as long as calyx tube. *Calyx-tube* villous; segments hairy, rotundate. *Stamens* many. *Fruit* brownish, ellipsoid, ·25-·3 in. long with a calyx rim narrower than the fruit.

KHASI HILLS.
Flrs. 6-7. Fr. 11-3.

8. Symplocos grandiflora *Wall.*

A tree (up to 60′/68″). *Bark* plain grey with white patches, ·5 in. thick, red and uniform texture inside. *Leaves* 5-7 by 1·5-2 in., lanceolate, acuminate, subentire or distantly dentate, rigidly coriaceous, glabrous; midrib depressed above; lateral nerves 8-10 on either half, prominent beneath, subparallel; base usually cuneate. *Flowers* in long (up to 5·5 in.) racemes; bracts deciduous; pedicels ·2 in. *Calyx* obconic, glabrous; segments 5, traingular-ovate. *Corolla* glabrous. *Stamens* numerous. *Fruit* ·5 by ·2 in., smooth, sub-cylindric.

Dafla Hills, SYLHET, KHASI HILLS.
Flrs. 12. Fr. 2.

9. Symplocos Hookeri *Clarke.*

Small tree. *Leaves* 5-12 by 2·5-4·5 in., oblanceolate or obovate-oblong, acute, minutely toothed, submembranous, glabrous, rather shining above; lateral nerves about 10 on either half, arched, very prominent beneath; tertiary parallel, transverse to the secondary; base cuneate; petiole 1-1·5 in. long. *Racemes* axillary; peduncles stout. *Calyx* segments rotundate, glabrous. *Corolla* not seen. *Fruit* ·6-·8 by ·3-·4 in. brownish, cylindric with a very hard stone; embryo straight.

(No specimen in Forest Herbarium).
KHASI HILLS (Nongklaw H. f. & T.).
Flrs. and Fr. 2-4.

10. Symplocos pealii *King.* ex. *Das.* nov. sp. Vern. *Thingjik,* Lushai; *Gahori Sapa,* Lakhimpur (wrongly?); *Naga tota, Mota-bhom-lati,* Sibsagar.

A small tree (30′/18″) often a large tree. *Bark* greyish brown ·12 in. thick, inside white (except the edges which

are reddish turning light-brown). *Wood* cream-coloured. *Leaves* 6-10 by 1·5-4 in. oblong, elliptic-oblong, glandular serrulate towards the apex, entire or sub-entire towards the base, obtuse or shortly acuminate, coriaceous, glabrous, paler beneath; lateral nerves 10-12 on either half, arcuate, prominent beneath; midrib impressed above, prominent beneath; base cuneate; petiole dark purplish, 1·25 in. long. *Flowers* reddish in tomentose cymose clusters or short spikes on old wood, axillary or extra-axillary; bracts about ·15 in. long, ovate or ovate-oblong. *Calyx* segments 5, ·1 ·12 in. long, ovate or ovate-oblate, tomentose without, glabrous within. *Corolla* lobes nearly free, oblong or elliptic-oblong, ·15-·12 in. long. *Stamens* 40 or more in several series, unequal. *Ovary* half inferior; style glabrous. *Fruit* ·6 in. long, sub-cylindric, greenish brown, sparsely puberulous, shallowly veined.

LAKHIMPUR (Kanjilal's No. 6868, 3385), SIBSAGAR (Peal's No. 279,59) CACHAR (Kanjilal's No. 4744), Burma-Mytkyina Dist. (Parkinson's No. 2979).

Flrs. 6-11. Fr. 2.

11. Symplocos lancifolia *Sieb.* & *Zucc.*

A small tree. *Branchlets* almost glabrous. *Leaves* 2-4 by 1-2 in., lanceolate to ovate-lanceolate, acuminate, crenately serrulate or sub-entire, thinly coriaceous; base cuneate or rounded; petiole up to ·2 in. long. *Flowers* small in axillary slender pubescent spikes; bracteoles rusty-pubescent, imbricate. *Calyx* strigose; segments obtuse. *Corolla* up to ·16 in. long. *Stamens* 25. *Ovary* glabrous. *Fruit* globose, the shape of a pea about ·3 in. long, greenish black.

SIBSAGAR—Deroi Rèserve.

Flrs. 10-11. Dry Fr. 10.

In Das Pflanzen-reich, Mez has separated S. viridissima *Brand* which is included under S. lancifolia in *F. B. I.* (iii), p. 577. S. viridissima is recorded from Patkoi mountain which has a much larger number of stamens 80-100 (Brandis) 40 (Mez).

12. Symplocos khasiana (*Clarke*) *Brand.*=Symplocos racemosa Roxb. Var. khasiana Clarke.

A small tree 25′/24″. *Bark* corky, grey, split both vertically and horizontally, ·5 in. thick; inside white, glabrous. *Leaves* 2-2·5 by 1-1·5 in., ovate-obtuse or apiculate, serrulate, glabrous; lateral nerves 5-7 on either half, cuneate or acute; petiole ·4-·5 in. *Spikes* ferruginous-hirsute. *Flowers* sessile on spikes. *Calyx-tube* somewhat glabrous; segments hardly sericeous, tube not long. *Ovary* pilose. *Fruit* 3-celled.

KHASI HILLS (Griffith No. 3663). N. C. HILLS (U. Kanjilal No. 6772).

Fr. 1.

13. Symplocos cratægoides *Ham.* Vern. *Dieng-iong, Jam-iang, Dieng-iang,* Khasi; *Dieng-iang,* Synt.

A large shrub or a small tree (often reduced to more bushy undershrub in Khasi Hills owing to severe cold). *Bark* light grey, rough, corky, fibrous with deep reticulate furrows; blaze yellowish; young parts hairy. *Leaves* 1-4 by 1-2 in., broad, elliptic or ovate-acuminate or acute, sharply glandular serrulate, more so towards the apex, membranous, almost glabrous above, pilose or glabrescent beneath; lateral nerves 5-7 on either half, slender, ascending; tertiaries prominent, transverse, forming parallel pits; base cuneate or rounded; petiole ·1-·3 in. long. *Flowers,* fragrant, yellowish-white, ·2-·3 in. across in axillary or terminal corymbosely panicled cymes; bracts caducous; pedicels long, filiform. *Calyx-tube* obconic; segments ciliate. *Corolla* connate at the base; lobes 5, almost free. *Stamens* numerous; filaments connate at the base into 5 bundles adnate to the base of the corolla. *Ovary* 2-celled. *Fruit* ·12-·3 in. long, obliquely ovoid or globose, crowned with the remain of the calyx segments, black when ripe, 1-seeded; embryo curved.

KHASI HILLS ascending up to 6000 ft.

The bark is considered a tonic. It is also used in ophthalmia. The leaves and bark give a yellow dye.

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

14. Symplocos spicata *Roxb.* Vern. *Dieng-ja-pei, Dieng-pei,* Khasi; *Dieng-lat-pe-rit,* Synt.; *Bhomlati, Bhomrati, Bhoirati, Rotha, Konha, Bhoratmuni, Bhoira, Bhomera, Motabhomlati;* Ass.; *Ashila, Malabol,* Garo; *Sungkhengbumphang, Sonkhimala, Boira,* Mech; *Bhumria,* Rajbongshi.

A small tree (25′/24″). *Bark* greyish dark-brown, plain green underneath the cuticle, ·25 in. thick; blaze cream-coloured to light brown, mottled with reticulating streaks of brownish coloured tissues. *Leaves* variable 2-6 by 1-2·5 in., lanceolate-elliptic, elliptic-lanceolate, obovate, crenate-serrulate or subentire, acute or bluntly acuminate, coriaceous (tough when dry), glabrous, shining above; lateral nerves 6-8 on either half; base acute; petiole up to ·5 in. long. *Flowers* scented, cream-coloured or yellowish, fragrant in solitary or paniculate axillary pubescent or glabrous spikes; bracts and bracteoles ovate, pubescent. *Calyx* almost glabrous; segments 5, almost equalling the tube. *Corolla* divided almost to the base. *Stamens* numerous. *Ovary* 3-celled. *Fruit* globose, ribbed, about ·3 in. across, surmounted by a short cylindric calyx-rim; embryo curved.

SIBSAGAR, LAKHIMPUR, DARRANG, KAMRUP, GOALPARA, GARO HILLS, KHASI HILLS—ascending up to 5,000 ft.

Decoction of the leaves is used in Indian medicine. Fruits are tied up in rosaries around the neck by Assamese.

Flrs. 9-10. Fr. 5-6.

15. Symplocos ferruginea *Roxb.* Vern. *Aslak,* Garo; *Garo-bhangra,* Ass. (Kamrup); *Sum-leg-arong,* Mik.; *Mota-bhomlati,* Ass.; *Dieng-lar-e, Dieng-lat-pe-soh-pangra,* Synt.

A medium sized or small evergreen tree (50′). *Bark* greyish-brown, about ·2 in. thick; blaze cream-coloured, mottled with brown; branchlets rusty villous; leaf-buds ferruginous-tomentose; young shoots and leaves are red. *Leaves* 4-10 by 1-3·5 in., elliptic-lanceolate, serrulate towards the apex, subentire or serrate, coriaceous, glabrous above, rusty hairy beneath, specially on the nerves; midrib strong, depressed above; lateral nerves prominent beneath, 8-12 on

either half, subparallel; petiole rusty tomentose ·2-·5 in. long. *Flowers* white, rather sessile in large compound rusty tomentose panicle; bracts ovate, rusty pubescent. *Calyx* rusty villous; segments 5, ovate. *Corolla* rotate; lobes 5, ovate. *Stamens* numerous. *Fruit* ·16 in across, globose, ribbed, crowned by the enlarged calyx segments.

GOALPARA, GARO HILLS, KAMRUP, NOWGONG, N. C. HILLS, CACHAR, SIBSAGAR, LAKHIMPUR, MIKIR HILLS, K. & J. HILLS.

Fruits are used for rosaries.

Flrs. 11-2. Fr. 5-7.

16. Symplocos oxyphylla *Wall.* Vern. *Thing-tai-kan,* Kuki; *Dieng-eit-sim* (= birds' droppings), Khasi; *Bhomrati, Bhomlati,* Ass.; *Tappor-changne,* Duff.; *Tam-tingali,* Ass.; (Sibs.).

A large evergreen tree (70′/50″); stem somewhat fluted. *Bark* greenish-brown outside, peeling off in large flakes; blaze white; young leaves blackish purple. *Leaves* bafarious, 3-6 by 1·5-2·2 in., elliptic-lanceolate to oblong-lanceolate, sub-caudate-acuminate, sinuately serrulate, coriaceous, dark green, glabrous; lateral nerves 5-8 on either half, joined by intramarginal nerves; base attenuate to the petiole, which is ·2-·5 in. long. *Flowers* small, shortly pedicellate in simple or compound racemes in the axils of the leaves or above the scars of fallen leaves; bracts minute, caducous. *Calyx* nearly glabrous; segments rotundate. *Corolla* large. *Fruit* ·25-·4 in. long, conical, narrowed upwards into a cylindric beak; embryo curved.

CACHAR, GARO HILLS, KAMRUP, DARRANG, LAKHIMPUR, SIBSAGAR, N.-E. F. TRACT, KHASI HILLS, up to 4,000 ft.

Timber used for bridge constructions.

Flrs. 8-9. Fr. 2-3.

17. Symplocos theæfolia *Ham.* Vern. *Dieng-pei, Dieng-tew-pe,* Khasi; *Chikam,* Miri.

A middle sized or small evergreen tree (66′/50″) with dense and more or less horizontal branches; branchlets angular. *Bark* dark-brown with vertical lines of lenticellate

warts; inside very faint, brownish white with very fibrous distant broad streaks of white, ·25 in. thick. *Leaves* 3-6 by 1-2 in., elliptic, elliptic-lanceolate, acuminate, sub-entire or shallowly serrulate, coriaceous, dark glossy green, quite glabrous, midrib raised on both surfaces; lateral nerves numerous, sub-parallel, rather inconspicuous; base cuneate; petiole up to ·6 in. long. *Flowers* whitish, sessile, in short axillary panicles; bracts and bracteoles broad-oblique. *Calyx* glabrous; segments 5, rather short. *Corolla* lobes oblong. *Disc* densely covered with long white hairs. *Stamens* many. *Ovary* 3-celled. *Fruit* ellipsoid-ovoid, ·25-·4 in. long; embryo straight.

LAKHIMPUR, DARRANG and KHASI HILLS (5,500 ft.). Flrs. 11-12. Fr. 5.7.

2. STYRAX Linn.

Trees and shrubs, hairs often stellate. *Flowers* usually white in lax terminal or axillary racemes, occasionally sub-solitary and axillary bracts small. *Calyx* campanulate, inferior or more or less perigynous, free or slightly adnate to the base of ovary, truncate or 5-4 toothed, persistent. *Corolla* tube short; lobes 5, imbricate in bud. *Stamens* 10, usually connate at the base and adnate to the corolla tube; filaments short; anthers large, linear. *Ovary* nearly free, incompletely 3-celled (1-celled above and 3-celled below), the dissepiments reaching to the middle; style subulate; stigma capitate; ovules few in each cell. *Fruit* globose or ellipsoid supported by the persistent calyx, chartaceous or coriaceous, breaking up irregularly, 1- or rarely 2- seeded; albumen copious; embryo straight; cotyledons flat or broad.

Branchlets stellately hairy. Inflorescence solitary or racemose :—	
Accrescent calyx cupuliform in fruit. Lateral nerves slender. Flowers small. ..	1. *S. serrulatum.*
Accrescent calyx deeply cleft in fruit. Lateral nerves depressed above, raised beneath. Flowers large.	2. *S. Hookeri.*
Branchlets glabrous. Inflorescence compound, dichotomous. Style obscurely 3-fid. ..	3. *S. polyspermum.*

1. Styrax serrulatum *Roxb.* Vern. *Dieng-ja-lym-maw, Dieng-ja-lat-pai, Dieng-eit-blang* (=Goat's castings).

Synt.; *Bolnarang, Narang, Bolmisi, Borkhigrak,* Garo; *Phulkat, Bhakulipatol,* Ass.; *Dieng-soh-lapaiet, Dieng-soh-byklong,* Khasi; *Dungrabom-phang,* Mech.; *Paga-apug,* Miri and Abor; *Ragang-asing,* Abor; *Yagur-asing,* Miri; *Paye-changne,* Duff.; *Bonkhomotai-baphang,* Kach.

A small evergreen tree or shrub (up to 50′/36″). *Bark* bitter, blackish smooth, ·3 in. thick; blaze yellowish mottled with brown granular streaks; wood cream coloured; young branchlets stellate-pubescent. *Leaves* 1·5-2·5 by ·8-1·5 in., lanceolate, elliptic, ovate-elliptic or oblong, acuminate, serrulate, chartaceous, glabrous above, very occasionally setulose, stellate pubescent beneath, ultimately glabrescent; lateral nerves about 7 on either half, slender, venation reticulate; base acute or rounded; petiole ·2 in. long. *Flowers* in axillary pedunculate fascicles or small racemes or subpaniculately racemed at the ends of branchlets. *Calyx* obscurely toothed or truncate, greyish tomentose. *Corolla* yellowish, 5-lobed; lobes oblong, obtuse, tomentose. *Stamens* yellow, 10; fialments inflexed over the ovary; anthers long, erect. *Ovary* hairy; ovules many. Fruit ellipsoid, ·4 in. long, rusty-tomentose, 1-4-seeded, surrounded by the accrescent cupuliform calyx.

Var. **agrestis.**—Calyx-tube brown hirsute with spreading hairs.

Var. **virgatum.**—Leaves ovate, broadest below the middle and larger flowers.

N.-E. F. TRACT, LAKHIMPUR, SIBSAGAR, DARRANG, NOWGONG, KAMRUP, GOALPARA, GARO HILLS, CACHAR and K. & J. HILLS.

Flrs. 3-4. Fr. 10-12.

2. Styrax Hookeri *Clarke.*

A medium siezed tree. *Leaves* 1·5-3 by ·8-8·7 in., elliptic-ovate, elliptic, serrulate, more conspicuously towards the apex, thinly coriaceous, setulose on the nerves above, sparingly stellately hairy beneath, especially on the nerves; lateral nerves 5-7 on either half, depressed above, prominent beneath, arched; base rounded or subcordate; petiole ·2-·3 in. long. *Flowers* yellowish, large, solitary (axillary or leaf opposed) or in small racemes at the ends of branchlets;

pedicels ·25 in.; buds ellipsoid, ·8 in. long. *Calyx* ·25 in. across, funnel-shaped, rusty tomentose, usually sharply 5-toothed. *Corolla* 5-partite; tube ·4 in. long; lobes short, imbricate in bud, membranous. *Stamens* 10; filaments partially free, stellate-tomentose. *Style* filiform, ·8 in., densely stellate pubescent. *Fruit* subglobose or ovoid, ·5 in. diameter.

K. & J. HILLS.

Flrs. 5. Fr. 10.

3. Styrax polyspermum *Clarke.*

A small tree. *Branches* glabrous. *Leaves* 3-6 by 1-2·5 in., lanceolate and oblong or elliptic, obscurely crenate, acute, thinly coriaceous, glabrous; lateral nerves about 10 on either half, much arched; base cuneate; petiole ·3-·5 in. long, slender, flattened above. *Flowers* in terminal or axillary dichotomously branched compound cymes; buds ellipsoid, ·12 in. *Calyx* densely silky tomentose outside; segments deltoid. *Corolla* densely silky outside; lobes oblong. *Stamens* 10, alternately longer. *Style* obscurely 3-fid. *Fruit* ellipsoid, pointed often with the remains of the style, about ·3 in. long, imperfectly 3-celled; testa chartaceous (fruit unlike styrax may indicate a new genus—Hooker, Brandis).

KHASI HILLS, (Kurz., Mann, Griffith); N. C. HILLS above Jatinga (U. Kanjilal).

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

(Engler in Das Pflanzen-reich has omitted this from genus Styrax).

3. PARASTYRAX W. W. Smith.

Parastyrax Lacei *W. W. Smith.*

A lofty tree 150 ft. in height or over. *Branches* robust, longitudinally sulcate. *Leaves* 4·8-6 by 2-3 in., alternate, oblong or elliptic-oblong, shortly acuminate or acute, entire or subentire, coriaceous, glabrous above, minutely stellate-tomentose beneath; lateral nerves 5-8 on either half, subparallel, prominent beneath; base cuneate. *Flowers* yellow in simple or subpanicled racemes, axillary to the upper leaves; pedicel ·1 in. long. *Calyx* cupular, short, ·05 in.

long, adnate below to the inferior ovary and is prolong upwards into a narrow ring with a slightly irregular margin, not toothed. *Corolla* 5-partite; tube short; lobes imbricate, lanceolate, ·33 by ·17 in., minutely tomentose. *Stamens* 10; filaments united into a tube, glabrous outside, minutely pilose inside; free part of filament very short or 0. *Ovary* ovoid (immature) 3 locular, partly inferior; stigma subtrilobed. *Mature* fruit wholly inferior, ellipsoid, 1·2 by ·4 in., covered with a fleshy exocarp and marked by elongate whitish lenticels; endocarp hard, woody.

N.-E. F. TRACT (3,000-4,700 ft.)—Rotung.
(Burkill's No. 36737, 37316 and 38190).

Flrs. 3.

FAM. 84. OLEACEÆ.

Trees or shrubs, erect or scandent, unarmed, rarely undershrubs. *Leaves* opposite, very rarely alternate, simple, trifoliolate or pinnate; petiole often articulated. *Flowers* hermaphrodite (rarely polygamous or diœcious) regular, 2-6-merous, sometimes poly or apetalous, in trichotomous terminal or axillary cymes or panicles. *Calyx* typically 4, inferior. *Corolla* lobes usually valvate or imbricate, rarely convolute, almost free in some species. *Stamens* 2, epipetalous; hypogynous in apetalous species; anthers dehiscing laterally or subextrorsely. *Ovary* inferior, 2-celled; stigma usually 2-lobed on simple style; ovules 1-2 in each cell, anatropous, attached to the inner angle near base or apex. *Fruit* drupaceous, capsular, baccate or dry schizocarp. *Seeds* 1 or 2, erect or pendulous; testa usually thin; albumen present or 0; embryo straight; radicle superior or inferior.

Corolla lobes much imbricate, radicle inferior :—
Seeds exalbuminous :—
Scandent shrub; fruit baccate. .. **1. Jasminum.**

Erect small tree; fruit a 2-valved compressed capsule. .. .. .. **2. Nyctanthes.**
Seeds albuminous; flowers in fascicles. .. **3. Osmanthus.**
Corolla lobes induplicate-valvate erect:—
Leaves simple, penninerved; fruit a drupe, radicle superior :—
Flowers in axillary panicles :—
Corolla distinct, lobes connate or free in pairs. .. .. **4. Linociera.**
Corolla tubular or 0. .. **5. Olea.**
Flowers in terminal panicles, corolla funnel-shaped. .. .. .. **6. Ligustrum.**
Leaves pinnate; fruit samaroid-indehiscent; calyx minute. .. .. .. **7. Fraxinus.**
Leaves simple, conspicuously trinerved, a large twining shrub. .. .. .. **8. Myxopyrum.**

1. JASMINUM Linn.

Shrubs, usually scandent, rarely undershrubs. *Leaves* opposite, rarely alternate, simple, 3-foliolate or imparipinnate; petiole usually articulated. *Flowers* mostly fragrant, usually handsome in terminal or axillary cymes, rarely solitary; bracts sometimes petaloid. *Calyx* tube funnel-shaped or campanulate; segments 4-9, usually linear or truncate. *Corolla* white, pinkish or yellow, salver-shaped; lobes 4-10 or more, spreading imbricate in bud. *Stamens* 2, usually included in the corolla tube; filaments very short; connective usually mucronate. *Ovary* 2-celled; style cylindric; stigma usually bifid; ovules 2 in each cell, basal. *Berry* didymous or simple by abortion, globose, ellipsoid or elongate. *Seeds* usually solitary in each carpel, erect, exalbuminous; testa thin; radicle inferior; cotyledons plano-convex.

Leaves opposite, simple :—
Calyx pubescent, segments twice the length of the tube or longer :—
Calyx-segments ·25-·3 in. long. Leaves ovate, even orbicular; lateral nerves about 3 on either half. .. .. .. *1. J. Sambac.*
Calyx-segments ·3-·5 in. long, filiform. Leaves ovate-lanceolate; lateral nerves about 3 on either half. .. .. .. *2. J. undulatum.*
Calyx-segments ·3-·7 in. long, hairy with yellow hairs. Leaves ovate; lateral nerves 3-4 on either half. .. .. .. *3. J. pubescens.*

Calyx-segments up to ·5 in. long. Leaves elliptic to ovate-lanceolate; lateral nerves 4 on either half. .. .. .. 4. *J. coarctatum.*

Calyx-pubescent, segments less than twice the length of the tube:—

Corolla tube about 1 in. long. Petiole conspiculously articulated. Leaves coriaceous, almost glabrous, punctate on the under surface. .. .. .. 5. *J. scandens.*

Corolla tube ·4-·6 in. long. Petiole channelled, often twisted. Leaves thinly coriaceous, glabrous. .. .. .. 6. *J. syringæfolium.*

Corolla tube ·2 in. long, Calyx-segments faintly villous, ·2 in. long, lateral nerves 4-5 on either half. .. .. .. 7. *J. Listeri.*

Calyx glabrous :—

Calyx-segments twice the length of the tube or more :—

Pair of basal nerves extending up to the apex of leaf and anastomosing with the secondary nerves. Cymes 1-5-flowered. 8. *J. anastomosans.*

Pair of basal nerves extending beyond half the length of the leaf, the pair often above the base. Cymes 3-flowered, sometimes solitary. .. .. 9. *J. subtriplinerve.*

Usually 3 nerved, basal pair sometimes not prominent. Cymes 3-5 flowered. .. 10. *J. laurifolium.*

Calyx-segments as long as or shorter than the tube :—

Lateral nerves 7-9 on either half. Corolla 1-1·4 in. .. .. 11. *J. glandulosum.*

Lateral nerves numerous obscure. Corolla ·7-·8 in. Calyx hemispheric. .. .. 12. *J. attenuatum.*

Lateral nerves 7-9 on either half. Corolla ·8 in. long. Calyx turbinate. .. 13. *J. subglandulosum.*

3 nerved :—

Corolla ·7-·8 in. Calyx teeth linear-subulate. .. .. .. 14. *J. calycinum.*

Leaves opposite, trifoliolate :—

Leaflets subcoriaceous, glabrous; lateral nerves 6-7 on either half. .. .. 15. *J. flexile.*

Leaflets membranous with tufts of hairs on the nerves beneath; lateral nerves distinct about 8 on either half. .. .. 16. *J. caudatum.*

Leaflets thickly coriaceous, glabrous, minutely punctate. .. .. 17. *J. lanceolaria.*

Leaves opposite, imparipinnate. .. .. 18. *J. dispermum.*

Leaves alternate :—
Leaves 1-3 foliolate. .. .. .. 19. *J. heterophyllum.*
Leaves simple. .. .. .. 20. *J. Wengeri.*

1. Jasminum Sambac *Ait.* Vern. *Duamali,* Ass.

An evergreen shrub erect or somewhat climbing; young parts pubescent. *Leaves* simple, opposite, occasionally ternate, very variable, 1-3 by ·5-2 in., usually ovate, even orbicular, finely acute or acuminate or obtuse, entire, membranous, glabrous above, pubescent beneath, specially along the nerves; lateral nerves slender, about 3 on either half; petiole up to ·25 in. long, pubescent. *Flowers* white, very fragrant, about 1 in. across, axillary, solitary or in 3-flowered cymes; pedicels pubescent; bracts linear-pubescent. *Calyx* pubescent; segments 6-8 up to ·3 in. long, linear, subulate. *Corolla* tube up to ·7 in. long; lobes oblong. *Carpels* black when ripe, globose, surrounded by the enclosed calyx lobes.

KAMRUP, GOALPARA. Cultivated for the exquisitely fragrant flowers which are generally double in cultivation.

Flrs. 3-6. Fr. Rainy season.

2. Jasminum undulatum *Ker.* Vern. *Salika-kund,* Darrang; *Injuri-apun-riube,* N.-E. F.

Scandent shrub. *Branchlets* pubescent; stem succulent. *Leaves* bifarious, 1·5-2·5 by ·6-1 in., ovate-lanceolate, acute or acuminate, entire, membranous, almost glabrous above with the exception of the midrib which is hairy, glabrescent beneath except the nerves which are more or less pubescent; lateral nerves about 3 (not conspicuous) on either half; base rounded or subcordate; petiole up to ·25 in. long. *Flowers* white, slightly scented in capitate cymes, usually slender on pilose lateral branchlets. *Calyx* segments ·3-·4 in. long, filiform, sparsely pubescent. *Corolla* tube 1 in. long, slender; lobes ovate-acute or acuminate. *Carpels* 1-2-lobed, blackish when ripe, enclosed in the pubescent calyx segments.

N.-E. F., SIBSAGAR, KHASI HILLS.

Flrs. 9-10. Fr. 1-3.

3. Jasminum pubescens *Willd.* Vern. *Hinjari-riube*, Abor; *Batguwamani, Kharhika-jai, Duamali*, Ass.

A scandent shrub; young parts villous. *Leaves* opposite, simple, 1-3 by ·7-1·75 in., ovate-acuminate, entire, more or less pubescent beneath; lateral nerves 3-4 on either half; base rounded, cordate or rarely slightly cuneate; petiole ·2-·4 in. long, pubescent. *Flowers* white, fragrant subsessile in short pedunculate cymes. *Calyx-segments* ·3-·7 in., linear, hairy, nearly as long as the corolla tube. *Corolla* tube ·6-·7 in. long; lobes oblong-lanceolate, shorter than the tube. *Fruit* of 1 or 2 carpels, globose or elliptic, surrounded by the calyx teeth, black when ripe.

N.-E. FRONTIER TRACT, LAKHIMPUR, SIBSAGAR, KHASI & JAINTIA HILLS.

Juice of root is considered infallible for snake-bites both internally and externally.

Flrs. 10-4, (often throughout the year). Fr. end of rains.

4. Jasminum coarctatum *Roxb.* Vern. *Kharikalata*, Ass., (N. Lakhimpur).

A large woody climber. *Bark* brown, striate, green below the cuticle. *Leaves* variable, 1-6·5 by ·6-2·5 in., simple, opposite, elliptic, ovate to oblong-lanceolate, entire, shortly acuminate, membranous, almost glabrous, shining, sometimes pilose on the midrib above and with tufts of hairs at the nerve axils beneath; lateral nerves about 4 on either half, arched; base occasionally subcordate, rounded or oblong; petiole up to ·5 in. long, articulated. *Flowers* about 1 in. across, white, fragrant in terminal capitate rusty pubescent congested cymes supported by foliaceous petaloid puberulous bracts (up to 1 in. long). *Calyx segments* up to ·5 in. long, pubescent. *Corolla* tube 1·25 in. long, slender; lobes 6-8, oblong-lanceolate, pointed. *Carpels* ellipsoid, ·5 by ·3 in.

N.-E. F. TRACTS, KAMRUP, LAKHIMPUR, SIBSAGAR, GOALPARA, LUSHAI HILLS, KHASI HILLS, ascending up to 4000 ft.

Flrs. 4-6. Fr. Rainy season.

5. Jasminum scandens *Vahl.* Vern. *Mei-twe-lih,* Khasi.

A scandent shrub winding anti-clockwise, climbing by means of its recurved petiole, sometimes trailing on grass; branchlets pubescent. *Leaves* simple, ·8-5 by ·5-2·2 in., ovate to lanceolate, acuminate, entire, coriaceous, nearly glabrous, very minutely punctate on the undersurface also sparingly pubescent on the nerves beneath; lateral nerves 3 on either half, impressed above; base rounded; petiole up to ·5 in., conspicuously articulated. *Flowers* white, tinged with red, fragrant in terminal compound 3-chotomous or subcapitate cymes, often on short axillary branchlets; pedicels short or O. *Calyx* pubescent; tube turbinate, ·1-·15 in. long; segments usually 6, subulate, up to ·2 in. long, recurved or curled. *Corolla* tube up to 1 in. long; lobes 6-8, ·3 in., oblong-acute. *Carpels* usually 2, ellipsoid, ·5-·6 by ·25 in.

SIBSAGAR, NOWGONG, SYLHET, GOALPARA, KAMRUP, GARO HILLS, KHASI & JAINTIA HILLS.

Flrs. 10-1. Fr. 2-5.

6. Jasminum syringæfolium *Wall.*

Climber. *Leaves* opposite, simple, 2-4 by 1-2 in., lanceolate to ovate, entire, finely acuminate, thinly coriaceous, glabrous; lateral nerves 3-4 on either half, (typically starting from near the base), much arched, very slender and inconspicuous above; base rounded; petiole ·3-·5 in., slender, channelled, often twisted. *Flowers* in terminal trichotomous cymes with slender branches and pedicels (which are pubescent). *Calyx teeth* linear, pubescent, about as long as the tube. *Corolla* tube ·4-·6 in.; lobes ·3-·4 in., oblong-ovate (or typically narrow-linear). *Carpels* ellipsoid.

(No specimen in Forest Herbarium.)
ASSAM (Brandis).

Flrs. 12-4. Fr. 3-5.

7. Jasminum Listeri *King. Mss.* in Calcutta Herbarium (No. 78).

Scandent shrub; branches pale-brown, glabrous. *Branchlets* faintly pubscent. *Leaves* opposite, ·3-5 by 1·25 in., lanceolate-acuminate, glabrous, sparsely pubescent on nerves beneath; lateral nerves 4-5 on either half, prominent beneath. *Cymes* axillary, rather lax, capitate, pubescent. much shorter than the leaves; peduncle ·3 in. long; pedicels ·12 in. long. *Bracts* subulate, minute. *Calyx-tube* subulate, faintly villous, ·2 in. long. *Corolla* white; tube ·2 in. long; lobes ·4 in. long. *Filaments* very short; anthers oblong, aristate. *Ovary* 2-celled; style cylindric, stigma bifd; lobes linear; ovules 2 in each cell.

LUSHAI HILLS-(Lungleh-A. T. Gage).

Flrs. 3-4.

8. Jasminum anastomosans *Wall.* Vern. *Kathmali-bibar*, Mech.; *Mei-lar-um*, Khasi.

A scandent shrub, winding anti-clockwise. *Bark* green. *Leaves* 1-4 by ·5-1·5 in., elliptic-lanceolate to ovate-lanceolate, acuminate, entire, chartaceous, glabrous; a pair of basal nerves extending up to the apex and anastomosing with the secondary nerves; base rounded or subcordate; petiole up to ·5 in. long, jointed. *Flowers* white in axillary 1-5 flowered cymes. *Calyx* segments usually 5-6, subulate, twice the length of the tube. *Corolla*-tube ·75-1 in. long; lobes usually 7-10 by ·5-·7 in., strap-shaped, acute. *Carpels* generally in pairs ·7 by ·35 in., ellipsoid.

Flrs. 4. Fr. 2.

GOALPARA, KHASI HILLS, LUSHAI HILLS.

Var. silhetense *Blume.*—Corolla-lobe half as long as the tube. This, in my opinion, should be considered as a form only.
KHASI & JAINTIA HILLS (U. Kanjilal's No. 6721).

9. Jasminum subtriplinerve *Bl.* Vern. *Bel-phuler-lot*, Sylh.

A large climber. *Bark* green, rough, thin. *Leaves* variable, 1-6 by ·5-2·3 in., ovate-elliptic, lanceolate, ovate-

lanceolate, shortly acuminate or sharply acute, enitre, coriaceous, glabrous above, postulate beneath, 3-nerved, the pair often above the base, midrib impressed above; base rounded or subcordate, often oblique; petiole up to ·6 in. long, jointed. *Flower* white, fragrant, usually in axillary 3-flowered sessile cymes, sometimes solitary; buds reddish; bracts linear, ·25 in.; pedicels short. *Calyx* reddish; segments usually 5, recurved, up to ·3 in. long, occasionally sparingly pubescent. *Corolla-tube* 1 in. long; lobes 5-8, oblong, acute, up to ·6 in. long. *Carpels* ellipsoid, ·5 by ·2 in.

MANIPUR, SYLHET, CACHAR, GOALPARA, SIBSAGAR, GARO HILLS, KHASI HILLS up to 5500 ft.

Flrs. 4-5. Fr. Cold season.

10. Jasminum laurifolium *Roxb.* Vern. *Kirkirilota,* Ass.; *Guti-mali,* Ass. (Kamrup).

A scandent shrub; stem succulent. *Branches* green, terete. *Leaves* bifarious, 1-5·5 by ·5-1·2 in., elliptic-lanceolate to linear-lanceolate, long-acuminate (often blunt) entire, subcoriaceous, glabrous; usually 3 nerved, basal pair sometimes not very prominent; base rounded or obtuse; petiole up to ·3 in. long. *Flowers* usually in 3-flowered terminal peduncled cymes; buds red. *Calyx* segments 5-7, filiform, usually spreading, ·25 in. long. *Corolla* tube ·6-·8 in. long, partially red; lobes 10-12, strap-shaped, acute, 1-1·25 in. long. *Carpels* 2.

LAKHIMPUR, KAMRUP, NAGA HILLS up to 1200 ft.

Flrs. 3-4. Fr. 7 or earlier.

Var. sublinearis *F. B. I.* Vern. *Bonkharikphullata,* Ass.—*Leaves* up to 7 in. *Calyx* segments ·15 in. long.
LAKHIMPUR (U. Kanjilal's No. 4126).

Flrs. 4.

11. Jasminum glandulosum *Wall.*

Scandent shrub, branches closely lenticellate; bark corky. *Leaves* simple, opposite, 2·5-4 by 1-2 in., elliptic or ovate-lanceolate, acuminate, entire, membranous, glabrous; lateral nerves 5-7 on either half, much arched, generally

anastomosing away from the margin to form an intermarginal nerve with hairy glands at the axils; base generally rounded; petiole ·3 in. long. *Flowers* solitary and axillary or in few flowered trichotomous, corymbosely branched terminal cymes; pedicels bracteolate about the middle, ·2-1 in. long, slender. *Calyx-tube* about ·25 in. long, often ribbed; teeth very short, but often sharp. *Corolla* tube 1-1·4 in. long, very slender; lobes linear, spreading. *Carpels* 1 or 2, unequal if 2, ellipsoid, ·75 by ·3 in., greenish purple.

KHASI HILLS (Railiang, U. Kanjilal, Shillong C. B. Clarke).

Flrs. 7-8. Fr. 1-2.

12. Jasminum attenuatum *Roxb.*

Scandent shrub. *Leaves* 3-6·5 by 1-2 in., oblong, acuminate, entire, rather thinly coriaceous, glabrous; midrib prominent beneath, channelled above; lateral nerves numerous, obscure; base rounded; petiole ·2-·7 in., slender. *Cymes* axillary, few flowered; pedicels very slender, ·3-·5 in.; buds oblanceolate. *Calyx* ·08 in. across, hemispheric, teeth minute, sharply pointed. *Corolla* ·7-·8 in. long; lobes ·3 in. long, ovate; tube trumpet-shaped. *Carpels* ·3-·4 in. long, ellipsoid, unsymmetrically lobed.

MANIPUR, KHASI HILLS, NAGA HILLS, SYLHET, N.-E. F. TRACT. (up to 6000 ft.). No specimen in Forest Herbarium, Shillong.

Flrs. 3-4. Fr. Probably rainy season.

13. Jasminum subglandulosum *Kurz.*

A scandent shrub. *Bark* thick, corky. *Leaves* 4-8·5 by 1·5-3 in., ovate-oblong, rather bluntly acuminate, entire, thinly coriaceous; lateral nerves prominent, 7-9 on either half; base rounded; petiole ·2-·8 in. *Flowers* in lax pedunculate racemes; pedicels slender, 1·1 in.; bracts minute, subulate, pubescent. *Calyx-tube* turbinate, ·15 in. long; teeth broad, short. *Corolla* tube up to ·75 in., slender; lobes about ·3 in. long, strap-shaped, blunt. *Carpels* 1 or 2, ·55 by ·3 in., ellipsoid.

GOALPARA, SIBSAGAR, KHASI HILLS.

Flrs. 9. Fr. 1-2.

14. Jasminum calycinum *Wall.*

A scandent ramous shrub. *Leaves* opposite, ·7-2·2 by ·6-·8 in., elliptic-ovate, acuminate, glabrous on both the sides, 3-nerved; nerves prominent underneath, impressed on the ventral surface; base obtuse, rounded; petiole ·15-·20 in. long. *Flowers* axillary or terminal, ·8-1·5 in. long; pedicel ·2-·6 in. long, 1-2 in a cyme; bracts subulate, ·07 in. long. *Calyx* with 6 linear-subulate teeth ·2-·4 in. long. *Corolla* tube ·7·8 in. long; lobes linear-lanceolate, ·6 by ·1 in. *Stamens* 2, included in the corolla-tube; filaments very short; anthers conical with a broad base attached at the back near the base. *Ovary* elliptic, 2-celled; style cylindric. *Fruit* not seen.

KHASI HILLS.

15. Jasminum flexile *Vahl.*

A large climber. *Bark* whitish, stem obscurely striate. *Leaves* opposite, usually trifoliolate. *Leaflets* 1·5-4·5 by ·5-2·3 in., laterals narrower than the terminal, ovate-lanceolate or elliptic, acute or acuminate, entire, subcoriaceous, glabrous, dark-green and shining; lateral nerves 6-7 on either half with tufts of hairs in the axils beneath, base rounded or obtuse; petioles and petiolules channelled; petiolules ·2-1·2 in. long. *Flowers* white, in lax slender pedunculate axillary and terminal paniculate cymes. *Calyx* teeth minute, acute. *Corolla* tube slender, 1-1·25 in. long; lobes ·6 by ·25 in., oblong, minutely apiculate. *Stamens* inserted about ·3 in. below the throat; anthers apiculate. *Style* exserted. *Carpel* ·3 in. long, ellipsoid.

KHASI HILLS (U. Kanjilal's No. 6138).

Flrs. 10-12 Fr. 3.

Var. ovatum *Wall.*—Leaflets narrower; base cuneate. *Inflorescence* few flowered.
KHASI HILLS (U. Kanjalal's No. 2792).

Flrs. 10.

16. Jasminum caudatum *Wall.* Vern. *Mei-long-kait-sree, Mei-soh-siang,* Khasi.

A large woody climber; stem grey. *Bark* whitish; *Leaves* 3-foliolate; lateral leaflets usually smaller than the terminal. *Leaflets* 1-5 by ·5-2·2 in., lanceolate or ovate-lanceolate, caudate-acuminate, obscurely undulate, membranous, glabrous with tufts of hairs on the nerve axils underneath; lateral nerves distinct, up to 8 on either half; base acute, rounded or obtuse; petiolule channelled up to ·8 in. long; petiole up to 1 in. long.

Wood light yellow.
KHASI & JAINTIA HILLS.
Flrs. 8-12. Fr. 1-3.

17. Jasminum lanceolaria *Roxb.*

A large scandent shrub; stem obscurely ribbed; old stem covered with brownish-grey cork. *Leaves* opposite, usually 3-foliolate. *Leaflets* 2-5 by ·5-2 in., elliptic, acuminate, entire, thickly coriaceous, glabrous, pale beneath, minutely punctate; lateral nerves obscure; base cuneate; petioles and petiolules channelled; petiolule ·2-1·2 in. *Flowers* white, in axillary or terminal compound rigid pedunculate trichotomous cymes; pedicels thickened in fruit; bracts linear. *Calyx-tube* ·15 in. long; teeth minute, triangular. *Corolla* large. *Carpels* 1-2, subglobose, ·5 by ·35 in., shining.

NAGA HILLS, KHASI HILLS up to 5000 ft.
Flrs. 4-5. Fr. 8-11.

18. Jasminum dispermum *Wall.* Vern. *Mei-tew-larmath-jongdi,* Khasi.

A glabrous scandent shrub twining anti-clockwise. *Leaves* opposite, imparipinnate, upper often 1-foliolate. *Leaflets* 3-5, terminal 3-4 by 1-1·8 in., lateral smaller, terminal cordate, lateral obliquely sub-cordate, lanceolate, acuminate, entire, coriaceous; rachis lanceolate, midrib and veins purplish-brown. *Flowers* fragrant, pinkish in few-flowered axillary cymes and many flowered elongated terminal panicles; pedicels up to ·3 in. *Calyx* teeth ·4 in.

long, triangular. *Corolla* tube ·5-·7 in. long; lobes ·2-·3 in. long, elliptic or ovate. *Carpels* ellipsoid, ·5 in. long, purplish black when ripe.

KHASI & JAINTIA HILLS.

Flrs. 4-5. Fr. Cold season.

19. Jasminum heterophyllum *Roxb.*

A straggling shrub, rather erect, sometimes a small tree; branches lenticellate. *Leaves* alternate, 1-3-foliolate. *Leaflets* 1-5 by ·8-2 in., ovate, ovate-lanceolate, caudate-acuminate, entire, coriaceous, glabrous; lateral nerves more or less conspicuous, impressed above; base usually rounded; petiolule ·1-·7 in. long. *Flowers* bright yellow, fragrant in terminal compound corymbiform cymes. *Calyx* teeth minute. *Corolla* tube ·3 in. long; lobes ovate or elliptic. *Carpels* 1-2, ·3-·4 in. long.

MISHMI HILLS, NAGA HILLS, MANIPUR, KHASI HILLS up to 4,600 ft.

Flrs. 5. Fr. 10.

20. Jasminum Wengeri *Fischer.*

A climbing shrub. *Branchlets* terete, patently brown-hairy. *Leaves* 1·3-2·5 by ·7-1·3 in., simple, ovate to ovate-lanceolate, attenuate, acute, margins more or less undulate, ciliate, brown-hairy on both surfaces, more densely so on the ribs and nerves; ribs 3-5, sub-palmate from the base with 2-3 pairs of nerves from the midrib, arching and anastomosing; base rounded or emarginate; petioles ·15-·27 in. long, shaggy with brown-hairs. *Cymes* terminal and from the upper axils, trichotomous, compact, shorter than the leaves; peduncle short, densely brown-hairy. *Calyx* ·19-·23 in. long, greenish tawny tomentose (dry); segments 5, linear-subacute, nearly as long as the tube, erect or nearly so, sinus narrow. *Corolla* tube slender, ·6-2·12 in. long, slightly widening upwards, glabrous; lobes usually 6, narrowly elliptic, acute, ·23-·31 in. long, glabrous. *Stamens* a little

below the throat of the corolla ·07 in. long; anthers apiculate. *Fruit* not seen.

S. LUSHAI HILLS 3500 ft.—W. J. L. Wenger (1926).

Flrs. 8.

J. grandiflorum *Linn.* Vern. *Chameli* Beng., *Jati*, San., The *Spanish Jasamine*, Eng.

A large glabrous scandent or subscandent shrub; branches ribbed. *Leaves* opposite, imparipinnate; leaflets 7-11 in. *Flowers* exquisitely perfumed, white, tinged with pink, in terminal cymes. *Calyx* teeth longer than the tube, (·3 in. long,) linear, subulate. *Corolla* tube ·6-·9 in. long; lobes 5, usually ovate. *Carpels* 2 (not seen).

KHASI HILLS, (Cultivated in Government Garden).

Flrs. 5-7. Fr. 8-11 (Flrs. & Fr. almost throughout the year).

J. dumicolum *W. W. Smith.*

A scandent shrub; branches slender. *Leaves* opposite, 6·2 by 1·75 in., narrowly lanceolate or oblong-lanceolate, cordate-acuminate, papery, glabrous; petiole ·2 in., glabrous, channelled. *Inflorescence* axillary or terminal, cymose. *Calyx* campanulate, about ·1 in. long; segments deltoid, acute. *Corolla* fragrant, white inside, deep rose, crimson outside; tube 1·5 in. long. *Stamens* sub-exserted. *Style* included. *Fruit* ellipsoid, about ·4 in. long, blackish.

NAGA HILLS, MANIPUR.

Fr. 6.

2. NYCTANTHES Linn.

Nyctanthes Arbor-tristis *Linn.* Vern. *Sephalika*, Beng.

A small deciduous tree or bushy shrub. *Branchlets* rough pubescent, 4-angular. *Bark* rough, brown, greyish or greenish. *Leaves* 3-5·5 by 1·5-3 in., ovate, shortly acuminate, distantly toothed or entire, coriaceous, scabrid; lateral nerves 4-6 on either half; base rounded, cuneate or acute; petiole ·2-·5 in. long. *Flowers* ·5-·7 in. across, sweet scented, sessile, 3-7 together on hairy quadrangular peduncles of various lengths which are arranged in cymes or cymose panicles; bracts elliptical, pubescent. *Calyx* tube ·2-·3 in., funnel-shaped, pubescent, obscurely 4-5-toothed. *Corolla* tube ·3-·6 in., cylindrical, orange red; lobes white, 5-8, obcordate, contorted in bud. *Anthers* sub-sessile near the mouth of the corolla tube. *Ovary* 2-celled; style cylindric, shortly bifid; ovules 1 in each cell. *Capsule* ·3-·5 in., orbicular, compressed, mucronate and often emarginate at the

apex, 2-celled; pericarp reticulate, leathery. *Seeds* roundish, compressed, exalbuminous.

Cultivated in ASSAM (GOALPARA, KAMRUP, LAKHIMPUR). Flowers usually come out in the evening and fall off in the next morning. *Flowers* are used in perfumery and the corolla tubes are used for dyeing. The juice of the leaves has various medicinal properties in Indian medicine used with other ingredients and are said to be efficacious for intestinal worms, fever, rheumatism and ascites.

Flrs. 8-10. Fr. 2-3.

4. OSMANTHUS Lour.

Osmanthus fragrans *Lour.*

A medium sized tree (up to 40′/60″). *Bark* plain, covered with horizontal lenticels when young, in maturity greyish or blackish-brown and rough outside with irregular depressions; inside hard and granular, reddish-brown, turning deep red on exposure, ·25 in. thick. *Leaves* decussate, 3-7 by 1-7 in., lanceolate, oblong-acuminate, entire, coriaceous, glabrous; lateral nerves slender, more or less obscure about 12 on either half; base acute; petiole ·5-·75 in. long, channelled. *Flowers* 4-merous, dicœcious, very fragrant in axillary bracteate fascicles (of 5-7-flowers); pedicels filiform, lengthening out to ·5-·6 in., as the flower expands. *Calyx* minute; segments shallowly deltoid. *Corolla* divided nearly to the base white, lobes imbricating in bud, oblong, ·12 in. long, obtuse; tube very short. *Drupe* about ·75 in. long, glaucous-blue (Brandis), dark purple when ripe containing a single ribbed stone (Osmaston).

Duffla Hills, KHASI & JAINTIA HILLS upto 7400 ft. (also cultivated or often shrubby).

Flrs. 10-11.

4. LINOCIERA Swartz.

Shrubs or trees. *Leaves* opposite, entire. *Flowers* in axillary or lateral, rarely terminal cymes or panicles, occasionally in small clusters; bracts small. *Calyx* small; segments 4. *Corolla* of 4 long or short lobes nearly free or connate, in pairs, induplicate valvate. *Stamens* 2; filaments short; anthers dehiscing marginally. *Ovary* 2-celled;

style short; stigma entire or obscurely 2-fid; ovules 2 in each cell, pendulous from the apex. *Drupe* globose, ellipsoid or oblong; endocarp bony or crustaceous. *Seed* usually solitary, pendulous; testa thin; albuminous or exalbuminous; radicle superior.

Petioles usually more than ·5 in. long. Ovary glabrous; style short. .. .. .. 1. *L. macrophylla.*
Petioles normally up to ·5 in. long or less. Ovary pilose; style as long as the ovary. .. 2. *L. terniflora.*

1. Linociera macrophylla *Wall.* Vern. *Silong-asing,* Miri & Abor; *Pakikatar-asing,* N.-E. F. T.; *Thengogri, Thenglokso, Thengouri,* Mik.; *Pareng,* Ass.; *Gangma-gobok, Selwalchi, Athewatat,* Garo; *Silphoi,* Sylh.

A middle sized tree (60′/60″). *Bark* greyish or greyish-brown, warty, green underneath cork ·16-·3 in. thick; blaze pale-yellow or pale-brown, mottled with brown streaks, turning darker-brown; with a resinous smell like mango. *Wood* white. *Leaves* 5-8 by 2-3 in., oblong to oblong-lanceolate, acute, rarely acuminate, occasionally obtuse, entire, coriaceous, glabrous, punctate on the upper surface; lateral nerves 6-13 on either half; base narrowed into the petiole; petiole up to 1 in. long. *Flowers* small, yellowish in densely flowered compound slender panicles (axillary or above the scars of fallen leaves). *Calyx* glabrous; segments ovate-acute. *Corolla* lobes velvety, fleshy, concave. *Ovary* glabrous; style short. *Fruit* ellipsoid, ·7 by ·3 in. on very much thickened pedicel.

Common throughout ASSAM (up to 5500 ft.).

Flrs. 3-4 Fr. 2-4.

2. Linociera terniflora *Wall.* Vern. *Kompone-silong-asing,* N.-E. F. Tract.

A middle sized tree. *Bark* grey with horizontal wrinkles, thin pale inside. *Leaves* 2-4 by ·1-1·75 in., elliptic to ovate-oblong, acuminate, sometimes blunt, entire, coriaceous, glaucous green; lateral nerves 8-9 on either half, impressed above, more conspicuous beneath; base narrowed into the petiole; petiole up to ·5 in. long. *Flowers* small, white, in

pubescent divaricate panicled pedunculate heads which are usually 3-flowered. *Calyx* pubescent; segments ciliate. *Corolla* lobes connate in pairs. *Ovary* finely pilose; style twice as long as the ovary. *Drupe* ·35 by ·15 in., ellipsoid.

N.-E. F., SIBSAGAR, KHASI HILLS.

Flrs. 12-2. Fr. following cold season.

5. OLEA Linn.

Trees or shrubs. *Leaves* opposite, simple, entire or toothed. *Flowers* tetramerous, small, bisexual, diœcious or polygamous, axillary, extra-axillary or rarely in terminal panicles. *Calyx* toothed or truncate. *Corolla* tube short; lobes 4, induplicate-valvate or 0. *Stamens* 2, epipetalous and exserted or sub-hypogynous; filaments short. *Stigma* capitate or bifid; ovules 2 in each cell. *Drupe* ellipsoid or sub-globose; endocarp bony or crustaceous; exocarp fleshy. *Seeds* usually solitary, pendulous; albumen fleshy, radicle superior.

Female flowers without petals :—	
Flowers whitish.	1. *O. dioica.*
All flowers with petals :—	
Flowers yellowish. ..	
Fruit ovoid, small.	2. *.O. dentata.*
Fruit ellipsoid, ·5 in.	*.O. dentata. Var. salicifolia.*

1. Olea dioica *Roxb.* Vern. *Poreng*, Ass.; *Bonbholuka*, Ass.; (Sibsagar); *Chapu*, Naga.

A middle sized tree (30′/20″), or a shrub. *Bark* greyish brown, warty having vertical fissures, sometimes peeling off in flakes; blaze brown, wood cream coloured, hard with a typical odour. *Leaves* very variable 1·5-7·5 by ·5-3·2 in., usually elliptic-lanceolate, entire or serrate, acute or acuminate; lateral nerves 8-12 on either half, impressed above, prominent beneath, sub-parallel, arcuate; base cuneate; petiole ·1-·5 in. long. *Flowers* small, white, diœcious in axillary or extra-axillary lax panicles with very slender branching. FEM. flowers.—*Calyx* 4 toothed; teeth triangular-acute. *Corolla* absent. MALE flowers.—*Corolla* deeply lobed;

lobes elliptic-obtuse. *Drupe* blue when ripe, ovoid, ·4 by ·3 in.

LAKHIMPUR, SIBSAGAR, DARRANG, KAMRUP, GOALPARA, GARO HILLS.

One of the species best suitable for fuel and charcoal.

Flrs. 3. Fr. 11.

2. Olea dentata *Wall.* Vern. *Thingcha*, Naga; *Reng-reng-arong*, Mik.

A tree (50′/72″). *Bark* dark grey, rough, ·3 in. thick; inside fibrous, turning yellowish brown; young parts obscurely puberulous. *Leaves* 2-5 by ·6-1·5 in., lanceolate, oblong-elliptic, bluntly acuminate, entire (Assam specimens), coriaceous, glabrous, midrib more or less impressed above; lateral nerves 9-10 on either half; base narrowed into the petiole; petiole ·2-·5 in. long, obscurely channelled, puberulous. *Flowers* dicœcious, small, yellowish, in axillary cymose puberlous panicles. *Calyx* minute; segments pubescent, *Corolla* campanulate; lobes 4, short. *Drupes* ovoid, glabrous.

N. C. HILLS.

Flrs. 3-6. Fr. Cold season.

Var. salicifolia *Wall* Vern. *Jongmi-kelok*, Mik.; *Dieng-sa-niriang-blai*, Synt.—A tree (60′/54″) with spreading crown; branches lenticelled, pubescent. *Bark* greyish brown, warty. *Leaves* 2-7 by ·5-1·8 in., lanceolate, serrate or distantly denticulate. *Male flrs.* in axillary panicles exceeding the leaves. *Corolla* ovoid. *Female flrs.* axillary or extra-axillary or terminal. *Fruit* ·6 in., ellipsoid, oblique.

N. C..HILLS, KHASI & JAINTIA HILLS.

Flrs. 10-11. Fr. 2.

6. LIGUSTRUM Linn.

Trees or shrubs. *Branchlets* often lenticellate. *Leaves* opposite, quite entire. *Flowers* bisexual, tetramerous, usually white in terminal often thyrsoid panicles, the lower nodes often with foliaceous bracts. *Calyx* small, truncate or toothed. *Corolla* funnel-shaped; lobes induplicate valvate. *Stamens* 2, adnate to the corolla tube; anthers oblong or

rounded, included or exserted. *Ovary* 2-celled; style rather long; stigma sub-clavate or thickened; ovules 2 in each cell, pendulous. *Drupe* 1-3-seeded; endocarp thin or chartaceous; testa thin; albumen fleshy; radicle superior.

Drupe longer than broad :—
- Corolla tube nearly as long as the calyx. Calyx campanulate, teeth minute; lateral nerves obscure beneath, 5-8 on either half. — 1. *L. robustum.*
- Corolla tube slightly longer than the calyx. Calyx truncate :—
  - Lateral nerves 9-12 on either half more or less distinct. Inflorescence usually pubescent. .. .. .. — 2. *L. compactum.*
  - Lateral nerves 8-10, irregular, slender on either half. Inflorescence usually glabrous. .. .. .. — 3. *L. lucidum.*
- Corolla tube twice as long as the calyx. Calyx almost truncate; lateral nerves very few, not conspicuous. .. .. — 4. *L. Massalongianum.*

Drupe globose :—
- Leaves ·8 in. long or smaller. Corolla tube extending the calyx; corolla lobes lanceolate-acute. Calyx tube obscure. .. — 5. *L. Myrsinites.*
- Leaves 4-5 in. long:—
  - Corolla tube extending the calyx; corolla lobes oblong, reflexed; bracts 0 or obscure. .. .. .. — 6. *L. confusum.*
  - Corolla lobes scarcely elliptic-oblong; bracts foliaceous, coriaceous. .. — 7. *L. nepalense.*

1. Ligustrum robustum *Bl.* Vern. *Bol-galde, Bolgeng-grak, Marakha-jathong,* Garo; (deer's leg). *Dieng-soh-lapaiet, Dieng-soh-siang, Dieng-soh-paiet,* Khasi; *Dieng-shieng-kha,* Synt.; *Thengpi-kindu-arong, Bengdi,* Mik.; *Thekai-ching,* Naga; *Tukra, Takora,* Ass.; *Borkungli,* Nep.; *Dakra,* Miri.

A middle sized tree (40′/40′) or a large shrub. *Bark* greyish, slightly split vertically, ·25 in. thick, rough; branchlets thickly lenticelled, spreading; blaze cream coloured with brown streaks. *Wood* cream coloured, hard. *Leaves* 2-farious, 1·5-5·5 by 1-2·5 in., elliptic, elliptic-lanceolate, ovate-lanceolate, narrowed at both ends, often acuminate (apex) entire, thinly chartaceous, glabrous glossy; lateral nerves irregular, obscure beneath, 5-8 on either half;

petiole ·1-·5 in. long. *Flowers* small, ·1 in. across, in pubescent or villous pyramidal panicles; bracts subulate. *Calyx* campanulate, teeth minute, 4. *Corolla* small, white; lobes spreadnig or reflexed. *Fruit* ellipsoid or cylindric, often slightly curved, ·3-·5 in. long, purplish black, when ripe.

K. & J. HILLS up to 5,600 ft.

Flrs. 5-7. Fr. 12-4.

Var. khasiana (U. Kanjilal No. 5925). Erect rigid shrub with straggling branches. *Leaves* opposite, bifarious ·8-4 by ·4-1·5 in.; branchlets 4-angled, lenticellate. *Fruit* ·25 by ·2 in., erect, rugose, usually 1-celled, 1-seeded; albumen copious, white; cotyledons flat, orbicular; radicle cylindric, superior.

2. Ligustrum compactum *Hook. f. & T.* Vern *Parseru-thing*, Kuki.

A small tree. *Bark* ashy brown, smooth, stem somewhat fluted; branches more or less lenticellate. *Leaves* 2·5 by ·7-1·5 in., elliptic-lanceolate or oblong-lanceolate, acuminate, entire, subcoriaceous, glabrous, shining above; lateral nerves 9-12 on either half, more or less distinct; base usually cuneate; petiole ·2-·5 in. *Flowers* ·2-·3 in. across, white, subsessile in thyrsoid panicles. *Calyx* truncate. *Corolla* tube short, funnel-shaped; lobes oblong. *Fruit* numerous, ·2-·3 in. long, ellipsoid, often slightly curved.

"Blaze rather fibrous, pale yellow, sometimes mottled with orange" (Osmaston).

N. C. HILLS, KHASI HILLS.

Wood white, moderately hard, close grained and durable.

Flrs. 6-7. Fr. Cold season.

3. Ligustrum lucidum *Aiton.* Vern. *Soh-pah-iet, Dieng-soh-la-paiet, Dieng-soh-pai-it,* Khasi.

A small tree. *Bark* grey, corky, inside dull white with coarse strands of dark-brown, sometimes dirty chocolate brown. *Branchlets* closely lenticellate. *Leaves* 1·5-5 by ·7-1·8 in., elliptic-lanceolate to ovate-lanceolate, acuminate. subcoriaceous, glabrous; lateral nerves 8-10 on either half, irregular, slender; base obtuse, often cuneate. *Flowers*

white, faintly scented, sessile in bracteate terminal, glabrous, panicles; bracts linear-lanceolate, caducous. *Calyx* tube ·2 in. long, almost truncate or obscurely toothed. *Corolla* lobes oblong, rounded, ·2 in. long. *Fruit* elongated, ·3 in. long (immature).

KHASI HILLS up to 5000 ft.
Wood hard, used for agricultural implements.

Flrs. 6-8. Fr. 11.

4. Ligustrum Massalongianum *Vis. Pl. Otto.* Vern. *Dieng-sha-kynriaw*, Synt.

A small shrub often bushy and densely leafy; branchlets grey, warty, often with scattered lenticels. *Leaves* ·1-2·5 by ·2-·4 in., lanceolate or linear-lanceolate, entire, acute at both ends, subcoriaceous, glabrous, old leaves yellow; lateral nerves very few, not very conspicuous; petiole ·1-·2 in. *Flowers* ·15 in. across, subsessile, white in terminal minutely hairy panicles; bracteoles linear-minute. *Calyx* almost truncate, ·05 in. long. *Corolla* tube ·1-·13 in. long, slender; lobes 4. *Anthers* partly exserted. *Style* exserted; stigma clavate. *Fruit* erect, oblong, ·4 by ·16 in., minutely rugose, bluish purple when ripe.

GARO HILLS, KHASI HILLS, ascending up to 5000 ft.

Flrs. 4-6. Fr. Cold season.

5. Ligustrum Myrsinites *Dcne.* Vern. *Diengphut-um*, Khasi.

A small much branched rigid shrub; branchlets densely hairy. *Leaves* ·4-·8 by ·2-·5 in., elliptic, entire, blunt, coriaceous, glabrous; lateral nerves obscure; petiole up to ·15 in. *Flowers* ·15 in. across, small in terminal racemose cymes or in axillary few-flowered cymes. *Calyx* glabrous; teeth obscure, triangular. *Corolla* hypocrateriform; tube exceeding the calyx; lobes 4, lanceolate, acute. *Stigma* clavate. *Fruit* globose, small, ·2 in. across.

KHASI HILLS ascending up to 6000 ft.

Flrs. 5. Fr. 9.

6. Ligustrum confusum *Dcne.* Vern. *Soh-lapiet-kynthei, Dieng-soh-phlang, Dieng-sit-nar,* Khasi, *Dieng-iang-dkhar,* Synt.

A middle sized tree; branchlets lenticellate; young shoots pubescent. *Bark* greyish, somewhat rough outside; blaze cream coloured, mottled with yellow. *Leaves* 6-5 by ·3-2·2 in., lanceolate, elliptic-lanceolate to ovate-lanceolate, entire, sharply acute, subcoriaceous, dark-green, shining; lateral nerves 5-6 on either half, very slender; base acute or rounded; petiole 2-6 in. long. *Flowers* white in terminal pubescent panicles; bracts 0 or very minute. *Calyx* glabrous; teeth 4, broadly oblong, acute. *Corolla* tube slightly exceeding the calyx; lobes 4, oblong, reflexed, about as long as the tube. *Fruit* 2-celled, globose, ·25 by ·15 in., purplish black when ripe, rather obliquely set on the pedicels; cotyledons flat; radicle superior.

KHASI HILLS up to 5000 ft.

Flrs. 4-6. Fr. 12-1.

7. Ligustrum nepalense *Wall.*

A small tree or shrub; branchlets lenticelled; young shoots and inflorescence pubescent. *Leaves* 1·5-4 by ·6-1·8 in., elliptic, elliptic-oblong or elliptic-lanceolate, acute or acuminate, entire, subcoriaceous, glabrous; lateral nerves 6-8 on either half, inconspicuous; base cuneate or rounded; petiole ·1-·5 in. *Flowers* white, subsessile or in terminal pyramidal bracteate panicles; bracts foliaceous, coriaceous, persistent, stalked; bracteoles oblong, minutely ciliate. *Calyx* campanulate, glabrous, obscurely and bluntly toothed; teeth blunt. *Corolla* tube scarcely exceeding the calyx; lobes 4, elliptic-oblong. *Drupe* globose, ·2-·3 in. long.

K. & J. HILLS ascending up to 6000 ft.

Flrs. 6-7 Fr. Cold season.

7. FRAXINUS Linn.

Fraxinus floribunda *Wall.* Vern. *Dieng-la-maheg,* Khasi.

A large deciduous tree (50′/48″). *Bark* ash-grey, smooth in young trees, corky and somewhat rough and

warty in mature trees; inside hard, granular, yellow, mottled with brown fibres and grains, inner layers more fibrous, showing distinct concentric layers, outer granular, soon turning dark-brown, astringent. *Leaves* opposite, imparipinnate; rachis 5-8 in. long. *Leaflets* usually 7, opposite, 4-7 by 1·5-2 in., lanceolate-ovate or oblong-elliptic, caudate-acuminate, shallowly serrate, membranous, glabrous above, puberulous on the nerves beneath when young; lateral nerves 10-14 on either half, slender with reticulated secondary nerves; base cuneate, unequal sided; petiolules ·2-·5 in. long, channelled (Leaves yellow when old). *Flowers* about ·15 in., usually bisexual in large compound terminal panicles; pedicels filiform, fascicled on the branches. *Calyx* minute, 4-toothed; segments acute. *Corolla* lobes ·12 in. long, linear-oblong. *Stamens* near the base of the corolla tube; filaments about ·1 in. long. *Stigma* 2-fid. *Fruit* samaroid, oblanceolate, ·1 by ·5 in., compressed, supported by the enlarged calyx with 4-minute sharp pointed teeth; wing about ·7 by ·16 in., very finely veined, emarginate.

KHASI HILLS up to 5000 ft.

Flrs. Rainy season. Fr. Cold season.

8. MYXOPYRUM Bl.

Myxopyrum smilacifolium *Bl.* M. Serrulatum A. W. Hill (in part). Vern. *Gohora-lata*, Ass.

A large evergreen scandent shrub. *Branches* 4-angular, glabrous. *Leaves* opposite, oblong to ovate, acuminate, entire, minutely toothed, coriaceous, 3-nerved or almost 5-nerved, veins reticulated; base cuneate or rounded, often unequal; petiole up to ·5 in. long. *Flowers* minute, yellowish in ample axillary or terminal trichotomous panicles. *Calyx* urceolate, sharply 4 segmented. *Corolla* lobes 4, concave, induplicate valvate in bud, tube longer than the calyx. *Stamens* 2 on the corolla tube; filaments short; anthers ovate, thick. *Ovary* 2-celled; stigma nearly sessile, 2-lobed; ovules 1-2 in each cell, attached near the base at the inner angle. *Fruit* ·3 in. across, 1-seeded, subglobose or 2-seeded, obovoid; pericarp crustaceous, purplish; albumen hairy; radicle inferior.

Mikir Hills, N.-E. FRONTIER TRACT, LAKHIMPUR, SIBSAGAR, DARRANG, KAMRUP, GOALPARA, SYLHET, CACHAR, N. C. HILLS, GARO HILLS.

Flrs. 4-5. Fr. Cold season.

FAM. 85. APOCYNACEÆ.

Trees or shrubs, rarely herbs, often twining; latex present. *Leaves* simple, usually opposite, entire, rarely with small obscure stipule. *Flowers* regular, bisexual, 5- or 4-merous in axillary or terminal cymes, sometimes panicled; bracts small. *Calyx* inferior, often glandular within at the base; segments imbricate. *Corolla* usually slaver- or funnel-shaped, often hairy within; lobes spreading, usually contorted and twisted in bud. *Stamens* epipetalous, alternate with the corolla lobes; filaments short, included; anthers linear-oblong or sagittate, sometimes spurred, usually conniving over the stigma, sometimes adhering to the stigma by the produced connective. *Disc* usually present. *Ovary* 2-celled or usually of 2 more or less distinct carpels, united by the style; ovules 2-many, rarely solitary. *Fruit* usually of free or connate follicles, more rarely winged; albuminous or exalbuminous; embryo straight; cotyledons concave, convolute or contorted; radicle superior.

I. Anthers included, free from the stigma; cells rounded at the base; seeds without coma or wing :—

Ovary 1-celled; placentas parietal :—

Fruit indehiscent (baccate). Corolla whitish or yellowish. .. .. **1. Willoughbeia.**

Fruit capsular spinescent; corolla yellow. .. .. .. **2. Allamanda.**

Ovary 2-celled :—

Climbing shrubs, unarmed; ovules many. .. .. **3. Melodinus.**

Armed shrubs; ovules few. .. **4. Carissa.**

Ovary of 2 distinct carpels adhering by the styles :—
Calyx glandular within; leaves whorled :—
Albumen ruminate; disc obsolete. **5. Alyxia.**
Albumen uniform; disc cup-shaped. **6. Rauwolfia.**
Calyx glandular within; 6-many ovuled; follicles 2 :—
Ovules biseriate :—
Seeds truncate :—
Leaves opposite; undershrubs. **7. Vinca.**
Ovules many seriate :—
Seeds winged :—
Leaves alternate or scattered; shrub or tree. .. .. **8. Plumeria.**
Seeds comose :—
Leaves whorled; seeds with tufts of hairs; large tree. .. **9. Alstonia.**
Leaves opposite; small tree. .. **10. Holarrhena.**
Seeds in an orange coloured aril:—
Leaves opposite. .. .. **11. Tabernæmontana.**

II. Anthers conniving in a cone round the top of the style and adherent to the stigma by a point on the connective; cells produced downwards into empty spurs; ovary of 2 distinct carpels united by the style; follicles 2; seeds comose :—
Anthers more or less exserted :—
Corolla lobes valvate; filaments long, spirally twisted. .. .. **12. Parsonsia.**
Corolla contorted; filaments short, not spirally twisted. .. .. **13. Vallaris.**
Corolla salver-shaped, throat naked. **14. Pottsia.**
Corolla rotate or salver-shaped with coronal scales. .. .. .. **15. Wrightia.**
Anthers included :—
Corolla with scales (5-10) :—
Leaves whorled; corolla lobes not tailed; erect shrub. .. .. **16. Nerium.**
Leaves opposite; corolla lobes tailed; twining shrub. .. **17. Strophanthus.**
Corolla throat naked :—
Flowers small, corolla sub-campanulate; lobes overlapping. .. **18. Parameria.**
Flowers very large, (1·5-4 in. long). Corolla lobes over lapping to the right :—
Corolla campanulate or funnel-shaped. .. .. .. **19. Beaumontia.**
Corolla salver-shaped. .. **20. Chonemorpha.**

Flowers very small; corolla lobes overlapping to the right; ovary exserted from the disc.; seeds beaked. .. .. .. **21. Ecdysanthera.**
Flowers medium sized (·3-1·5 in. long) :—
Corolla salver-shaped, lobes nearly straight or twisted to the left; seeds ovate-oblong. .. .. **22. Aganosma.**
Corolla salver-shaped, lobes twisted to the left in bud, tips not deflected :—
Seeds beaked :—
Ovary exserted from the disc. .. .. .. **23. Rhynchodia.**
Ovary hidden in the disc. **24. Anodendron.**
Seeds not beaked; ovary exserted from the disc. .. **25. Trachelospermum.**
Flowers small; corolla salver-shaped, sharply twisted to the left in bud, tips deflected :—
Seeds beaked. .. .. **26. Ichnocarpus.**
Seeds not beaked. .. .. **27. Micrechites.**

1. WILLOUGHBEIA Roxb.

Willoughbeia edulis *Roxb.* Vern. *Pabhoi-tenga,* Mech.; *Gedraphol, Laleng-tenga, Bel-tata,* Ass.; *Lalong-doukha,* Kach.; *Kenjet,* Mik.

An immense woody climber exuding milky juice. *Bark* dark-brown, somewhat warty; branchlets obscurely ribbed; tendrils long branched. *Leaves* 3-6 by 1·5-3·5 in., oblong or ovate-oblong, obtusely acuminate, slightly undulate, coriaceous, dark above, reddish-brown beneath; lateral nerves about 10 on either half, prominent (with many intermediate ones) anastomosing at the margin, midrib stout, raised below; base cuneate or rounded; petiole ·2-·6 in. *Flowers* fragrant in axillary cymes; buds oblong, straight. *Calyx* 5-partite, eglandular, tube short, teeth shorter, ciliate. *Corolla* hypocrateriform, mouth naked; tube ·2 in. long, rather swollen in the middle; lobes yellowish, cream coloured, narrow-oblong, ·5 by ·12 in., overlapping to the right, slightly ciliate along the veins or right margins. *Stamens* included; anthers subsagittate, cells rounded at the base. *Ovary* 1-celled, conical, acute; style short; stigma conical, puberulous. *Fruit* pyri-

from, many seeded, 2-3 by 1·5-2·25 in., red; many seeded, 2-3 by 1·5-2·25 in., red. *Seeds* somewhat flat, ·6 by ·3 in., exalbuminous.

LAKHIMPUR, SIBSAGAR, GOALPARA, NOWGONG.
Fruits are edible, pulp acid.

Flrs. 5. Fr. Cold season (12).

2. ALLAMANDA Linn.

Allamanda cathartica *Linn.*

An unarmed scandent shrub often suberect. *Leaves* whorled, mostly quarternate, oblanceolate, subsessile; lateral nerves strong, jointed by an intermarginal nerve; petiole with intrapetiolar glands. *Flowers* showy, yellow in axillary panicled cymes; branchlets subulate, ·15 in. long. *Calyx* 5-fid. *Corolla* 2 in. long; tube cylindrical, ·5 in. long; limb ventricose; lobes 5, rounded, throat hairy. *Anthers* 5, subsessile, adnate to the tip of the corolla tube with a tuft of white hairs at the base and a sharp (filamentary) hairy ridge below; style slender, white, glabrous, ·5-·6 in. long; stigma urn-shaped. *Ovary* 1-celled, placenta parietal; ovules many. *Fruit* spiny, size and shape of a Datura, 2-valved. *Seeds* flat, shallow, corrugated; albumen horny, cotyledons white, flat; radicle superior.

An American species, cultivated, GOALPARA (Kumguri).

Flrs. 4. Fr. Cold season.

3. MELODINUS Forst.

Evergreen erect or scandent shrub. *Leaves* opposite. *Flowers* 5-merous (rarely 4) white or pale-pink in terminal or axillary cymes. *Calyx* eglandular within. *Corolla* salver-shaped, tube cylindric, dilated, more or less opposite to the stamens, mouth with thick cleft or lobed scales, lobes overlapping to the left. *Anthers* included, sub-sessile, oblong-lanceolate, cells rounded at the base. *Disc* nil. *Ovary* 2-celled; style short; stigma thick, bifid; ovules many. *Fruit* a berry, pericarp coriaceous or hard. *Seeds* numerous, imbedded in pulp; albumen fleshy, cotyledons thin, foliaceous.

Flowers in terminal paniculate cymes :—
Leaves up to 6·5 by 2·5 in., chartaceous. Flowers 1 in. long. Fruit about 3 in. diameter. .. .. 1. *M. monogynus.*
Leaves up to 5 by 1·5 in., membranous. Flowers less than ·75 in. long. Fruit about 1·5 in. diameter. .. .. 2. *M. khasianus.*

1. Melodinus monogynus *Roxb.* Vern. *Soh-brab,* Khasi; *Jermei-sah-laroh, Tylli-siertuh,* Synt.

A large climber with milky juice, glabrous; branches smooth, brownish; old leaves yellow. *Leaves* 2-6·5 by ·5-2·5 in., elliptic-oblong or oblong-lanceolate, acuminate, margins obscurely recurved, chartaceous, glabrous; lateral nerves 15-20 on either half, slender; intermediate nerves numerous, often forked; reticulation transverse; base cuneate or rounded; petiole ·2-·4 in. long. *Flowers* white, fragrant in terminal trichotomously branched puberulous paniculate cymes. *Calyx-segments* ciliate, ovate-oblong, ·1-·15 in. long, *Corolla* tube ·5-·7 in. long, widening upwards, villous within, lobes up to ·5 in. long, oblong-obtuse, oblique, coronal scales villous 5, bifid at the apex. *Berry* globose, smooth, orange coloured, 3 in. across.

SIBSAGAR, NOWGONG, GOALPARA, KHASI & JAINTIA HILLS (4000 ft.).

Flrs. 4. Fr. 10-1.

2. Melodinus khasianus *Hook. f.* Vern. *Soh-brab-rit,* Khasi.

A climber. *Bark* grey, rough, thin; blaze cream coloured. *Leaves* 1·5-5 by ·5-1·5 in., narrow, lanceolate-acuminate, margins recurved, membranous, glabrous; lateral nerves about 19-22 on either half, slender with many intermediate nerves; reticulation transverse; base narrowed into a short petiole ·05-·3 in. long. *Flowers* white, turning yellowish in terminal cymes (Inflorescence much smaller than *M. monogynus*). *Calyx-segments* ·1 in. long, margins sparingly ciliolate. *Corolla* tube ·2 in. long, slightly puberulous outside; lobes ·2 in. long, rounded, coronal scales villous at

the margins, deeply 2 cleft. *Berry* white, 1·5 in. across, ellipsoid.

SYLHET, KHASI HILLS (6000 ft.).

Flrs. 5-7. Fr. Cold season, persists long on the plant.

4. CARISSA Linn.

Carissa Carandas *Linn.* Vern. *Karenja*, Beng.

A large shrub armed with a pair of stout, sometimes branched, spreading spines up to 2 in. long. *Leaves* 1·3-3·3 in., oblong or elliptic-oblong, distinctly nerved. *Flowers* scented, ·5-·6 in. across, in sessile or peduncled corymbose cymes, cells of ovary with 4-ovules in each cell. *Berry* ellipsoid or globose, 4 or more seeded, ·5-1 in. long.

Cultivated for the fruits which are largely pickled or eaten raw. They are reputed to have antiscorbutic properties.

Flrs. 4-5. Fr. Cold season.

5. ALYXIA Br.

Shrubs, sometimes scandent. *Leaves* coriaceous in whorls of 3-4, rarely opposite, nerves obscure. *Flowers* small in axillary or terminal cymes. *Calyx* short, usually 5-partite, not glandular within. *Corolla* hypocrateriform, tube cylindric, throat naked, lobes 5, twisted, overlapping to the left. *Stamens* attached above the middle of the corolla tube; anthers lanceolate; base rounded. *Disc* absent or obscure. *Ovary* villous of 2 distinct carpels; style filiform; stigma oblong-lanceolate or capitate, pointed or bifid; ovules 2-6, biseriate in each carpel. *Fruit* of 1 or 2 drupes. *Drupes* 1-seeded or with 2 to one-seeded joints. *Seeds* ovoid or oblong, grooved or ventrally concave; albumen horny, ruminate; cotyledons thin; radicle superior.

Cymes long-peduncled, 2-4 in. long. Leaves 2-3·5 in. long.	1.	*A. gracilis.*
Cymes short-peduncled, ·3-1 in. long. Leaves 3-6 in. long.	2.	*A. fascicularis.*

1. Alyxia gracilis *Benth.*

A twining shrub, glabrous. *Leaves* opposite, 3 in a whorl, 1-2 by ·5-·7 in., elliptic-oblong or elliptic-lanceolate,

entire, bluntly acuminate, coriaceous, glabrous, shining above, pale beneath; lateral nerves quite obscure, midrib impressed above; base acute or cuneate; petiole ·1-·2 in. long. *Flowers* small in axillary slender branched long peduncled spreading, panicles 2-4 in. long; bracts small, ovate-acute. *Calyx* teeth ·06 in. long, acute. *Corolla* ·12-·16 in. long; tube twice as long as the calyx; lobes oblong, obtuse, as long as the tube. *Carpels* drupaceous, ellipsoid, stipitate, ·75 in. long, smooth.

(No specimen in Forest herbarium-Shillong).
SYLHET, KHASI HILLS (up to 4000 ft.).

2. Alyxia fascicularis *Benth.* Vern. *Tille-thang,* Synt.

A large woody climber almost glabrous. *Bark* greyish-white, lenticellate. *Leaves* ternate or opposite, 1-4·5 by ·5-1·5 in., elliptic-oblong or oblong-lanceolate, acuminate, coriaceous, glabrous, shining above; lateral nerves numerous, very slender, parallel; base narrowed into the petiole ·1-·4 in. long. *Cymes* ·75-1 in., densely flowered; peduncles ·4 in. long. *Calyx* ·25 in. long; segments ovate, ciliolate, sparsely pubescent outside. *Corolla* ·2 in. long, hairy within the tube. *Drupe* oblong-ovoid, usually 2 from the same flower. *Seeds* solitary or 1-4, superposed.

CACHAR, KHASI & JAINTIA HILLS (6000 ft.).
Flrs. 5. Fr. Cold season.

6. RAUWOLFIA Linn.

Shrubs or undershrubs, glabrous, rarely pubescent. *Leaves* 3-4-nately whorled, rarely opposite, axils glandular; nerves slender, usually arched. *Flowers* 5-merous in corymbose or umbellate cymes, alternate with the terminal leaves or axillary to the upper leaves. *Calyx* eglandular. *Corolla* tube cylindric, sometimes dilated opposite the stamens; the mouth constricted, the throat usually densely hairy within, lobes overlapping to the left. *Stamens* included; filaments short; anthers small, acute, cells rounded at base. *Disc* annular or cup-shaped. *Ovary* of 2 carpels distinct or connate; style filiform; stigma calyptriform at the base, tip

bifid; ovules 2 in each carpel, collateral. *Fruit* drupaceous, connate or distinct, usually 1-seeded. *Seeds* ovoid; testa thin; albumen fleshy; cotyledons flat; radicle superior.

An undershrub. Corolla tube slender dilated a little above the middle. Leaves usually in whorls of 3; lateral nerves up to 12. ..	1. *R. serpentina.*
A large shrub. Corolla tube slender, dilated below the middle Leaves usually in whorls of 3-4; lateral nerves up to 20.	2. *R. densiflora.*

1. Rauwolfia serpentina *Benth.* Vern. *Arachontita,* Ass.; *Jowansu,* Mik.; *Birshi-wathi,* Kach.; *Karti,* Kuki; *Kharu-khu,* Mech.; *Todong-pait-parao,* Khasi.

An evergreen undershrub. *Bark* pale-brown. *Leaves* 2·7 by ·5-2 in., oblong-lanceolate or eliptic-lanceolate, acute or acuminate, rather membranous, glabrous, dark glossy green above, pale beneath; lateral nerves 8-12 on either half; base tapering; petiole ·1-·3 in. long. *Flowers* white (tube usually pinkish) ·5-·8 in. long, in long, pedunculate, terminal or axillary compact corymbose cymes; pedicels very short, bright scarlet; bracts minute, subulate, stout. *Calyx* glabrous; segments ·1 in. long, lanceolate, bright red. *Corolla* tube often curved, about ·3 in. long; lobes ·15 in. long. *Disc* large, cupular, slightly lobed. *Carpels* slightly connate. *Fruits* didymous or solitary, ·25 in. across, pointed smooth, black when ripe.

KAMRUP, NOWGONG, N. C. HILLS, GOALPARA, KHASI & JAINTIA HILLS, SYLHET, GARO HILLS (R. N. De).

The roots are said to be a reputed cure for snake-bite. Leaves and roots are used medicinally as febrifuge and tonic and as an anthelmintic and also in dysentery. It is reported to be a specific for insanity. (R. N. De).

Flrs 4-10. Fr. 7-1.

2. Rauwolfia densiflora *Benth.* Vern. *Dieng-la-tyrking, Dieng-soh-bu-blang* (tree with milk like goats'), *Dieng-la-tyr-kai, Dieng-ja-soh-korblang,* Khasi; *Dieng-lar-kei,* Synt.

A large shrub, sometimes a small tree; branches thick and covered with lenticels. *Bark* grey, corky. *Leaves* 5-10

by 1-3 in., oblanceolate or obovate-acuminate, subcoriaceous, glabrous, bright-green above, pale beneath; lateral nerves 10-20 on either half, arcuate; base cuneate; petiole ·5-1 in. long. *Flowers* ·3 in. long, white tinged with pink, in lax cymes; peduncles 3-4 in. long; pedicels slender; bracts minute. *Calyx* lobes slender, ·16 in. long. *Corolla* tube almost ·25 in. long; lobes elliptic-oblong. *Drupes* very rugose, ellipsoid, solitary or in pairs, purplish black when fully ripe, supported by the persistent calyx. *Seeds* flat, tubercled.

KHASI & JAINTIA HILLS' (1500 ft.).

Flrs. 6-9. Fr. Cold season.

Var. macrophylla.—A shrub about 6 ft. high. *Leaves* broader, very membranous. *Drupe* red.

SIBSAGAR.

R. chinensis *Hemsl.* (*Journ* Lin. Soc. XXVI (1889-95) (Ophioxylon chinense *Hance* in Journal of Botany III (1865) 380).

A diffuse erect undershrub, nearly allied to R. serpentina *Benth.* *Bark* greenish-grey; lenticels whitish. *Leaves* 4-6·5 by ·75.2 in., short petioled, opposite, entire, lanceolate, membranous, attenuate at both ends, glabrescent. *Cymes* axillary, solitary or 2-5 aggregate together. *Calyx* glabrous, partly greenish; segments triangular or subulate. *Corolla* white, glabrous outside, tomentose inside; lobes obtuse, tube shorter. *Drupes* ovoid, blackish.

CHINA, SOUTH LUSHAI HILLS, ASSAM (Brandis).

7. VINCA Linn.

Vinca rosea *Linn.* Modern name Lochnera rosea (L.) Reichb.—A small evergreen under shrub. *Leaves* up to 2 in. long, obovate, oval or oblong, glossy. *Flowers* 1-1·5 in. across, white or deep rose in axillary pairs. *Follicles* single, slender, about 1 in. long.

A common garden plant.
Flowers almost throughout the year.

8. PLUMERIA Linn.

Plumeria acutifolia *Poiret.* Modern name Plumeria acuminata Aiton. Vern. *Gulaich, Gulachi,* Sylh.; *Gulanchi* or *Gunach,* Ass.; *Mir-kong-long-arong,* Mik.

A small soft wood tree. *Bark* corky fissured; branches herbaceous. *Leaves* 6-12 in. long, oblanceolate, fleshy with

an intramarginal nerve. *Flowers* ·2 in. across, white, fragrant with yellow centre, purplish outside, in terminal peduncled cymes; bracts deciduous. *Calyx* 5-fid. *Corolla* salver-shaped, deciduous. *Anthers* obtuse. *Carpels* 2; ovules many serrate; stigma bilobed. *Fruit* of 2 linear-oblong follicle. *Seeds* winged.

Extensively cultivated throughout the province in gardens and near temples.

The bark, leaves, flower buds and latex are used medicinally in India.

Flrs. Hot season.

9. ALSTONIA Br.

Alstonia scholaris *Brown.* Vern. *Bong-khlong, Bon-khlang-phang,* Kach.; *Sing-gar-asing,* Miri & Abor; *Souti-asing,* Miri; *Sotiana, Chhaiten,* Ass.; *Thengmu-arong, Thengpei-recho-arong,* Mik.; *Dieng-rytten, Dieng-ryteng,* Khasi; *Khami, Satni, Chhatni,* Sylh.; *Chong-pereng,* Kuki; *Letuang,* Tipp.; *Sethona,* Mech; *Sokson, Bor-chhak-chhan, Sokchuan,* Garo; *Satiana,* Jharua.

A tall evergreen tree; branches whorled, trunk buttressed or fluted. *Bark* grey with large horizontal lenticel-bar and light vertical fissures. *Leaves* in whorls of 4-7, 2-6 by 1-2·5 in., obovate, oblanceolate or elliptic-oblong, emarginate, rounded or bluntly acuminate, coriaceous, glabrous, shining above, pale beneath; lateral nerves numerous, parallel, terminating in an intramarginal nerve; base narrowed into the petiole, ·25-·5 in. long. *Flowers* greenish-white in compact umbellately branched pubescent panicled cymes; bracts leafy; bracteoles minute; pedicels very short. *Calyx* small, 5-fid, pubescent; segments oblong, ciliate. *Corolla* ·3-·5 in. across, pubescent outside, hairy within, constricted in the middle; lobes ovate-obtuse, spreading. *Stamens* included, attached to the middle of the corolla tube; anthers acute. *Ovary* villous of 2 distinct carpels; ovules many; stigma bifid. *Follicles* 2, slender, pendulous, terete, up to 2 ft. long and ·2 in. in diameter. *Seeds* ·3 in. long, flattened, oblong with tuft of brownish hair at either end.

Common throughout the province.

The wood is whitish, even grained, seasons badly. It is used for tea boxes, packing cases, etc. The bark is used as an astringent, anthelmintic, alterative and antiperiodic. It is efficacious in chronic diarrhœa and advanced stage of dysentery. The milk is applied to ulcers and mixed with oil in ear-ache. (*I. M. Plants*). The latex yields a kind of inferior crude caoutchouc.

Flrs. 2-4. Fr. 5-7.

10. HOLARRHENA Br.

Holarrhena antidysenterica *Wall.* Vern. *Bol-mara, Mat-mande, Bolmigmu,* Garo; *Dudhkhuri,* Jharua; *Dudkhuri, Dhutkhuri,* Ass.; *Theng-lokso, Bing-wai-pi-arong, Bengol-arong, Bengoy-the-arong,* Mik.; *Khirra,* Nep.; *Dieng-pang-knai, Diengpankanaisynrang, Dieng-lakhiet-dkhar, Dieng-jameu,* Kh.; *Kholoshiphang-jola, Khiloshi-jalla-phang,* Kach.; *Leng-wom-theng,* Kuki.

A small deciduous tree (40′/46″); stems of large trees irregularly fluted. *Bark* soft, greyish-brown, rough, warty, having wrinkles about 2 in. apart, ·3 in. thick; blaze brownish-yellow, faintly mottled brown, exuding latex; young parts pubescent. *Leaves* 3-10 by 1·5-4 in., elliptic or elliptic-oblong, acute or acuminate, coriaceous, glabrous or pubescent; lateral nerves 10-14 on either half; base obtuse or rounded; petiole up to ·2 in. long. *Flowers* white, turning yellowish, ·7-1·5 in. across, slightly fragrant, puberulous, in lax terminal corymbose cymes, which are 3-6 in. across; pedicels slender; bracts minute, lanceolate, pubescent. *Calyx* pubescent, deeply cleft; segments lanceolate, acuminate, glandular at base. *Corolla* salver-shaped; tube ·5 in. long, slightly dilated at the base, hairy within; lobes oblong, twisted to the left in bud. *Anthers* subsessile, mucronate. *Carpels* 2, distinct; style short; stigma united; ovules numerous. *Follicles* 2, divaricate, 8-16 by ·2-·4 in., slightly curved, usually dotted with white specks. *Seeds* ·5 in. long, hairs silky about 1·5 in. long, light tawny.

Throughout the province, ascending up to 3,000 ft. The bark and seeds are valuable remedy for dysentery and are febrifuge and tonic. The wood is white, soft and even grained (wt. 40 lbs.) suitable for

carving. Lamp-stands and other household articles are made of the wood.

Flrs. 4-6. Fr. Cold season.

11. TABERNÆMONTANA Linn.

Tabernæmontana coronaria *.Br.* Modern name Ervatamea coronaria (Jacq.) Stapf. Vern. *Themdaudiphang, Sindur-buphang,* Kach.; *Mirnoda-arong, Miharai, Mir-herai, Mir-herel,* Mik.; *Dieng-ja-soh, Dieng-soh-sangaia, Dieng-soh-moien, Dieng-mad-lah, Kombat-sintew,* Khasi; *Kekep-asing,* Abor; *Hleng,* Lush.; *Naimitlien,* Tipp.; *Bonkhorsani,* Nep.; *Hindur goch, Kathmalati, Kathandaphul, Akhajiphul, Kothnaiphul,* Ass.

A handsome evergreen bushy shrub dichotomously branched. *Bark* greyish white, lenticellate; blaze greenish. *Leaves* 3-6 by 1-1·8 in.; elliptic-oblong, oblanceolate or oblong, acuminate or caudate, rather coriaceous, glabrous, shining, green above, pale beneath; lateral nerves slender, 5-6 on either half; base narrowed into the petiole ·25-·5 in. long. *Flowers* pure white, 1-1·5 in. across, fragrant, in axillary or terminal lax corymbose cymes.. *Calyx-segments* short, obtuse or rounded, glandular within. *Corolla* tube ·7-1 in. long, slightly dilated in the middle, throat glandular; lobes elliptic-oblong, obtuse, margin overlapping to the left, crumpled in bud. *Stamens* included; anthers subsessile, acuminate. *Carpels* 2, distinct; stigma bilobed. *Follicles* 1-3 by ·4 in., divaricate, sessile or shortly stipitate, 3 ribbed, somewhat fleshy, recurved, red or orange inside. *Seeds* enclosed in a red aril.

Common throughout the province, ascending up to 2,000 ft.; cultivated in gardens. In cultivation the flowers become double.

Flrs. 2-5. Fr. Cold season.

12. PARSONSIA Br.

Parsonsia spiralis *Wall.*

An evergreen twining shrub, glabrous; branchlets terete. *Leaves* 2-5 by ·7-3 in., elliptic, ovate-oblong or oblong-lanceolate, acuminate, rather coriaceous, glabrous; lateral

nerves slender, 4-8 on either half, arcuate; base cuneate, rounded or subcordate; petiole ·5-1·3 in. long; interpetiolar stipular glands small, subulate. *Flowers* greenish or yellowish in axillary rather compact corymbose cymes, branching 3-chotomous. *Calyx-segments* ovate, thick, ciliate. *Corolla* tube cylindric, exceeding the calyx, glabrous, hairy at the throat with a red centre. *Filaments* twisted; anthers sagittate-lanceolate, conniving over and adhering to the stigma. *Carpels* 2, connate; stigma columnar; ovules numerous. *Fruit* of 2 connate follicles separating when fully ripe, 4-6 by ·7 in. *Seeds* ·75 in., coma pale golden brown.

SYLHET, KHASI HILLS, (5.500 ft.).

Flrs. 7-8. Fr. Autumn season, persist long on the plant.

13. VALLARIS Burm.

Vallaris Heynei *Spreng.* Modern name Valloria solanacea (Roth) O. Kze. Vern. *Mei-soh-sangia*, Khasi; *Kari-lewa, Jokhuni-lewa, Go-hingia* (cow's horn), *Gendheli-lata*, Ass.; *Kholosi-dukha*, Kach.; *Thang-rui-moi*, Kuki.

A large dextrose woody twining shrub; branches ashy grey, lenticellate. *Bark* on old stem brownish grey, warty, ·16 in. thick; blaze brownish; exuding milky juice. *Leaves* 1·5-5 by ·6-1·75 in., opposite, distichous, oblong-lanceolate to elliptic, acuminate, rather membranous, almost glabrous; lateral nerves 6-9 on either half, very slender; base obtuse or acute; petiole ·2-·5 in. long; stipules reduced to an intra-petiolar bristly ridge. *Flowers* ·5-·8 in. across, white, scented in lax axillary usually dichotomous panicled pubescent cymes; bracts linear-lanceolate ·1-·2 in. long; pedicels slender, ·2-·4 in. long. *Calyx* 5-partite; segments pubescent, oblong-acute. *Corolla* salver-shaped, pubescent outside; tube short, ·1-·2 in. long, hairy within; lobes ovate, rounded, overlapping to the right. *Filaments* dilated; anthers acute, hairy, connivent into a cone round the stigma and adnate to it, connective with a round gland on the back. *Disc* 5 fid; lobes obtuse, ciliate. *Ovary* of 2 connate carpels; style pubescent; stigma thick, cónical; ovules many. *Follicles*

4-6 by 1-1·5 in., tapering from a broad base. *Seeds* beaked, ·5 in. long; coma silky white, ·7 in. long.

Common throughout the province, specially in the plains district. *Bark* very bitter and astringent. Milky juice is a mild irritant and applied on wounds and sores causing inflammation and thereby expedites the process of healing. (Watt's Dictionary of E. P.).

Flrs. 1-4. Fr. Cold season.

V. assamica *Griff.* Vern. *Doukha-kaphuti,* Kach.—A climber spreading itself on tallest trees in dense shady forests. *Leaves* 1·5-3 by ·7-1·3 in. *Flowers* rather with a goaty smell. *Calyx* segments oblong-lanceolate, acute, rather exceeding the corolla tube. *Corolla* lobes greenish-white. *Stamens* at the mouth of corolla tube; anthers glabrous. *Disc* obsolete.

DARRANG, NOWGONG.

Flrs. 4.

14. POTTSIA Hook & Arn.

Pottsia cantonensis *Hook. & Arn.* Modern name Pottsia laxiflora (Bl.) O. Kze.

A large evergreen climbing shrub; young shoots brown pubescent. *Leaves* 2-3·5 by 1-2 in., ovate or elliptic-ovate, acuminate, membranous, glabrous above, sparsely pubescent along the midrib beneath; lateral nerves 5-6 on either half, subparallel, arcuate along the margin, tertiaries finely reticulated; base rounded or subcordate; petiole 1-4 in. long. *Flowers* pinkish, in axillary or terminal rusty puberulous drooping lax panicles; bracteoles small; pedicels slender, ·5 in. long. *Calyx* tube very short; segments ovate, glandular within. *Corolla* tubular, angled, deeply 5-lobed. *Anthers* sagittate, spurred, conniving over and adhering to the stigma. *Follicles* slender, 1 foot long, flexuous, smooth. *Seeds* 1 in. long, slender, black; coma 1-1·5 in. long.

KHASI HILLS, (4,000 ft.).

Flrs. 6. Fr. Cold season.

Thevetia nerifolia *Juss.* Yellow oleander. Modern name Thevetia peruviane (Pers.) Merr.

An evergreen shrub or small tree. *Leaves* 3-6 by ·5-4 in., linear, glossy-green, spirally arranged, margins recurved. *Flowers* yellow, fragrant, about 2 in. across in few flowered cymes. *Ovary* of 2, more

or less connate carpel. *Fruit* roundish, somewhat longitudinally constricted, fleshy; pericarp breaks into 2 when ripe; mesocarp woody, breaking into 2 valves.

A native of S. AMERICA. Cultivated for the flowers.

The latex is very poisonous.

15. WRIGHTIA Br.

Shrubs or trees. *Latex* white or yellowish. *Leaves* opposite. *Flowers* in terminal or subaxillary cymes. *Calyx* short, 5-partite with glands or scales within. *Corolla* salver-shaped; tube short, cylindrical with one or two seriate scales in the throat; lobes overlapping to the left. *Stamens* at the top of the corolla tube; filaments short, dilated; anthers sagittate, exserted, conniving in a cone round the stigma and adhering to it, cells spurred at the base. *Disc* 0. *Carpels* free or connate; ovules many; stigma ovoid, usually with a toothed basal ring. *Follicles* distinct or connate. *Seeds* linear, compressed with a deciduous coma at the base; albumen scanty or none; cotyledons broad, convolute; radicle short, superior.

Flowers greenish-white, turning yellow :— Corolla tube as long or longer than the calyx segments. Leaves tomentose. Follicles 6-12 by ·5 in., coronal scales orange-oblong, often laciniate or toothed.	1. *W. tomentosa.*
Flowers scarlet :— Corolla tube shorter than the calyx segments. Leaves minutely white, pubescent along the nerves, otherwise glabrous. Follicles 6 by 1·1·5 in., coronal scales round, crimson, almost entire.	2. *W. coccinea.*

1. Wrightia tomentosa *R. & S.* Vern. *Bolmatra, Bol-golmatra, Bolmatma,* Garo; *Makta-dudhkduri,* Jharua; *Garo-dudkhuri, or Horu dudhkhuri, Dud-khori, Dudhgach.* Ass.; *Bongoi-arong, Bing waisu-arong, Bengoi, Bengol-arong,* Mik.; *Kholosiphang-jig, Kholosing,* Kach.; *Aleng,* Kuki; *Chota-khirra,* Nep.; *Dieng-panganai or pankanai,* Khasi; *Thou-khuri, Jolphol,* Mech; *Aleng-thing,* Tipp.

A small deciduous tree. *Bark* grey or greenish-brown rough corky, often warty, ·25 in. thick; blaze whitish with green edges, turning yellowish after sometime, exuding a

sticky latex; extremities tomentose. *Leaves* distichous, 3-7 by 1·5-3 in., elliptic or elliptic-oblong, entire, sometimes obscurely serrulate, caudate-acuminate, rather membranous, velvety tomentose usually on both surfaces but always beneath; lateral nerves 8-16 on either half; base narrowed into the petiole, ·2-·4 in. long with tufts of hairs on the axils. *Flowers* 1 in. across, white-greenish, turning yellowish creamy, not pleasantly scented, pubescent, in many flowered terminal corymbose cymes; pedicles slender, up to ·3 in. long; bracts deciduous, linear-lanceolate, ·5 by ·1 in. *Calyx* tomentose; segments rounded, ciliate. *Corolla* tube about ·25 in. long; coronal scales orange or red, toothed; lobes oblong, twisted to the left. *Fruit* 8-12 by ·5-7 in. of 2-connate follicles united through the entire length, grooved at the junction of the carpels, verrucose with whitish lenticular dots. *Seeds* numerous, ·5-·7 in. long, slender, apiculate; coma of white silky hairs, 1·2-2 in. long.

Common almost throughout the province.

The wood is yellowish creamy, moderately hard, close grained (weight about 40 lbs.) and is used for turnery and curving.

Flrs. 5-6. Fr. Cold season.

2. Wrightia coccinea *Sims.* Vern. *Tara-makpong-nasing*, Abor; *Pousit-asing*, Miri; *Pong-khlung-baphang*, Kach.

A tree (60′/38″). *Bark* whitish grey outside, ·2 in. thick, very light, greenish white inside with copious milky latex; glabrous or sparsely pubescent; branches lenticellate. *Leaves* 2-farious, drooping, 3·5-6·5 by 1-2 in., elliptic, elliptic-lanceolate or elliptic-oblong, caudate-acuminate, entire, membranous, minutely white pubescent along the nerves, otherwise glabrous; lateral nerves 7-9 on either half, subparallel, arching; base rounded or cuneate; petiole ·05-·1 in. long. *Flowers* about 1 in. across, scarlet, in few flowered terminal cymes; bracts large. *Calyx-segments* rounded, ·3 in. across. *Corolla* 1·5 in. across, coronal scale crimson, rounded, entire. *Follicle* 10-12 by 1-1·5 in., slightly flattened on the sides; lobe 2, shallow, furrows of the carpels are distinct, speckled with numerous elevated lenticels. *Seeds*

·65 in., compressed; tips naked; base with a caducous silky coma 1·6 in. long.

N.-E. F. TRACT, SIBSAGAR, NOWGONG, NAGA HILLS, SYLHET, CACHAR, KHASI & JAINTIA HILLS.

Flrs. 5. Fr. Cold season.

16. NERIUM Linn.

Nerium odorum *Soland.* Modern name Nerium indicum Mill. Sweet scented oleander. Vern. *Karabi, Rakta Karobi,* Beng.

An erect beautiful evergreen shrub. *Leaves* usually ternate, 2-6 by ·5-1 in., linear-lanceolate, tapering at both ends, coriaceous, glossy green above, paler beneath; nerves obscure, numerous, parallel. *Flowers* 1·5 in. across or more, fragrant, usually rosy, in terminal cymes. *Calyx* divided nearly to the base, segments transverse, about ·2 in. long. *Corolla* tube ·5-·7 in., funnel-shaped, hairy within; coronal scales ·5 in.; lobes laciniate. *Stamens* at the top of the corolla tube; anthers sagittate, spurred, connivent into a cone and adhering to the stigma; connective produced into long thread-like hairy appendages, which are twisted together. *Ovary* of 2 distinct carpels; style dilated upwards; stigma sub-globose. *Follicles* connate, 6-8 by ·3-·4 in., ridged, at length separating. *Seeds* linear, ·2 in. long, villous with a terminal coma of brownish hairs, ·5 in long.

Shillong, (cultivated).

The plant is poisonous, specially the roots. The flowers are important adjuncts of certain Hindu rituals.

Flrs. 4-6. Fr. Cold season, (but most of the year in cultivation).

17. STROPHANTHUS DC.

Strophanthus Wallichii *A.DC.* Vern. *Mei-reng-blang* (goats-horn creeper), Khasi.

A climber, turning clockwise, glabrous; branches stout, lenticelled. *Leaves* 2-5 by 1·1·8 in., elliptic or elliptic-oblong, entire, undulate or obovate, cuspidate or acuminate, membranous, glabrous, paler beneath, midrib impressed above; lateral nerves 6-8 on either half, arcuate, anastomosing into an inter-marginal nerve; tertiaries elegantly

reticulated; base cuneate or rounded; petiole slender, ·1-·25 in. long; stipular glands interpetiolar. *Flowers* pale yellow or pinkish, purple veined in dichotomous cymes. *Calyx* glandular within; segments subulate. *Corolla* tube ·75 in. long, constricted at the middle; lobes broad, twisted, caudate up to 2 in. long; coronal scales 10. *Anthers* sagittate, base spurred, produced in a long awn, connivent round the stigma and adhering to it. *Disc* 0. *Carpels* distinct; ovules many, many seriate; style slender. *Follicles* divaricate through an angle of 170°, green, glabrous, 4 by ·6 in., very slightly curved inward. *Seeds* green, flattened, fusiform, narrowed into a plumose tail; coma silky white; cotyledons flat, oblong.

CACHAR, KHASI & JAINTIA HILLS.

Seeds of *Strophanthus hispidus DC.*, furnishes the effectual drug strophanthin

Flrs 1-2. Fr 10.

18. PARAMERIA Benth.

Evergreen climbing shrubs. *Leaves* opposite, rarely 3-nately whorled. *Flowers* small, in broad lax terminal or axillary panicles. *Calyx* small, 5-fid or partite, glandular at the base within. *Corolla* campanulate or hypocrateriform: tube short; mouth naked; lobes 5, oblique, twisted, overlapping to the left. *Stamens* attached to the base of the corolla, included; filaments short; anthers sagittate, acute or apiculate, connivent over and adhering to the stigma, cells spurred at the base. *Disc* of 5 connate scales. *Carpels* 2, distinct; ovules many; style short; stigma conical. *Follicle* distantly torulose. *Seeds* linear or oblong, compressed, crowned with short persistent ring of bristly hairs and a long deciduous coma; albumen scanty; cotyledons thin, leafy; radicle superior.

Leaves 1·5-3·5 by ·8-2 in., lateral nerves 7-10 on either half, distinct; pedicels puberulous; anthers not apiculate; disc obscurely 5 lobed.	1. *P. polyneura.*
Leaves 1-2·5 by ·5-·8 in., lateral nerves 4-6 on either half, obscure; pedicels glabrous; anthers apiculate.	2. *P. pedunculosa.*

1. Parameria polyneura *Hk. f.* Vern. *Mikirtengalata,* Ass.

A slender climbing shrub, extremities puberulous. *Leaves* 1·5-3·5 by ·8-2 in., elliptic, elliptic-oblong or obovate, abruptly acuminate or acute, membranous, glabrous, paler beneath, midrib and nerves impressed above, prominent beneath; lateral nerves 7-10 on either half; base acute or narrowed into the petiole, ·3-·5 in. long. *Flowers* ·15 in. long, small in terminal puberulous trichotomous paniculate cymes; pedicels short, puberulous, slender, ·15 in. long. *Calyx-segments* ·05 in. long, obscurely ciliolate. *Corolla* lobes sparsely puberulous. *Anthers* not cohering at base, not apiculate. *Follicles* divaricate, slender, glabrous, 20-24 in. long. *Seeds* fusiform, 1-1·25 in. long, crowned by a silky coma 2 in. long.

DARRANG.

Flrs. 5. Fr. Rainy season.

2. Parameria pedunculosa *Bth.*

A slender climber. *Leaves* 1-2·5 by ·5-·8 in., elliptic, shortly acuminate, membranous, glabrous; lateral nerves 4-6, obscure; base acute or narrowed into the slightly decurrent petiole ·4-·7 in. long. *Flowers* pinkish outside, rosy inside in pedunculate glabrous paniculate cymes; pedicels ·15 in. long, glabrous. *Calyx-segments* acute, very small. *Corolla* campanulate; lobes ovate, acute, glabrous, spreading. *Anthers* almost cohering at the base, apiculate.

MANIPUR, N. C. HILLS.

Flrs. 5. Fr. Rainy season.

19. BEAUMONTIA Wall.

Very large climbing shrubs. *Leaves* opposite, nerves strong, arched. *Flowers* very large, white, in terminal cymes; bracts leafy. *Calyx* 5-partite, glandular or eglandular within: segments large, foliaceous. *Corolla* with short tubular base, campanulate or funnel-shaped, with large broad lobes overlapping to the right, throat naked. *Stamens* at the top of the tube, included; filaments long, thickened at the top;

anthers horny, sagittate, conniving round and adhering to the stigma, spurred at base. *Disc* deeply 5-lobbed. *Ovary* 2-celled; style filiform; stigma oblong, fusiform; ovules many. *Fruit* long, thick, woody, finally separating into 2 follicular mericarps. *Seeds* compressed, oblong or ovoid, attenuated at the apex and crowned by a coma; testa rugose; albumen thin, cotyledons foliaceous or thick; radicle short, superior.

Corolla 3-4 in. long; lobes shorter than the tube.	1. *B. grandiflora.*
Corolla 2 in. long; lobes equalling the tube. ..	2. *B. khasiana.*
Corolla 2·5 in. long; lobes shorter than the tube	3. *B. longituba.*

1. Beaumontia grandiflora *Wall.*

A large stout woody climber, extremities rusty pubescent. *Leaves* 5-12 by 2-7 in., opposite, elliptic-oblong or ovate-oblong, abruptly acuminate, membranous, glabrous above, sprasely tomentose beneath; lateral nerves distant, 10-25 on either half, subparallel, arcuate; base acute, often oblique; petiole ·5-1·5 in. long. *Flowers* white, very large, upto about 6 in. long in terminal cymes; bracts leafy; pedicels pubescent. *Calyx* 5-partite; segments foliaceous, 1-2 in. long. *Corolla* 3-4 in. long, almost glabrous, campanulate above; throat naked; lobes short, overlapping to the right. *Stamens* adnate to the tip of the tube, included; anthers linear, sagittate, connivent round and adnate to the stigma, spurred at the base. *Disc* deeply 5-lobed. *Carpels* 2, connate; ovules many; style filiform; stigma fusiform. *Fruit* thick, woody, at length separating into 2 spreading follicles. *Ripe* carpels very variable, fleshy, about 6 in. long. *Seeds* compressed, ·75 in. long, surrounded by a coma twice as long.

N. C. HILLS, GARO HILLS, DARRANG, GOALPARA. (also cultivated).

Flrs. Rainy season. Fr. Cold season.

2. Beaumontia khasiana *Hk. f.*

A large climber. *Leaves* 8-10 by 4-4·5 in., elliptic or obovate-acuminate, tomentose beneath. *Flowers* short.

Peduncles and pedicels long. *Calyx-segments* ·5 in. long. *Corolla* about 2 in. long, broadly campanulate; lobes rounded, equalling the tube; limb 4 in. across.

KHASI HILLS, (Nongkhlaw-Lobb).

Flrs. 3.

No specimen in Forest herbarium, Shillong. No type sheets in Calcutta herbarium. There are some sheets from cultivated plants only (flowers.)

3. Beaumontia longituba *Craib.* (Report. Sp. Nov. Vol. XII, 1913).

A large climber. *Bark* pale brown, reticulately seriate, somewhat lenticellate; branches glabrescent. *Leaves* 6·5 by 2·5 in., oblanceolate or oblong, caudate-acuminate, chartaceously coriaceous, more or less glabrous on both sides; lateral nerves about 12 on either half, anastomosing into an intramarginal nerve, conspicuous above or somewhat uniform, more prominent beneath; base cuneate or broadly cuneate; petiole ·5 in. long, channelled above. *Calyx-segments* linear-lanceolate, ·4 in. long. *Corolla* tube 1·7 in. long; lobes oblong, about ·7 in. long, ·4 in. broad. *Filaments* about ·33 in. long, glabrous; anthers ·4 in. long. *Style* 1·5 in. long; base shortly pubescent, glabrous towards the upper end.

Allied to Beaumontia khasiana.

MANIPUR (Meebold-6615), 4,000 ft.

20. CHONEMORPHA G. Don.

Stout woody large climbing shrubs. *Leaves* opposite, large and broad, nerves arching. *Flowers* 5-merous, large, white, in lax terminal and pseudo-axillary paniculate cymes. *Calyx* with a ring of glands within. *Corolla* salver-shaped; tube short, lower part narrow, upper part wider; throat naked; lobes broad, oblique, overlapping to the right. *Stamens* 5, included; filaments short, villous; anthers sagittate, elongate, connivent over and adhering to the stigma, cells shortly spurred at the base. *Disc* thick, annular or cupular. *Carpels* 2, distinct; style filiform, cleft at base; stigma conoid or subclavate; ovules many. *Follicles* long, straight, woody, triquetrous. *Seeds* ovoid or oblong, prduced in a beak surrounded

by a large silky coma; albumen thin; cotyledons flat-oblong, radicle short.

Leaves large; lateral nerves 8-12; petiole ·5-2 in. long.	1.	*C. macrophylla.*
Leaves smaller; lateral nerves 10-14; petiole ·5-1 in. long.	2.	*C. Griffithii.*

1. Chonemorpha macrophylla *G. Don.* Vern. *Samphari,* Manip.; *Banpumloai,* Naga; *Ther-jarmi-kongwan,* Khasi.

A large powerful climber with copious milky juice, branches lenticellate; young parts pubescent. *Leaves* very large, 6-18 by 5-12 in., elliptic-ovate, obovate or suborbicular, cuspidate, coriaceous, glabrescent above, pubescent below; lateral nerves 8-12, strong, distant, almost parallel, arcuate; reticulation transverse, irregular; base rounded or cordate; petiole ·5-2 in. long; stipules reduced to glandular tooth. *Flowers* large, fragrant, pure white, 2·5-3 in. across, in axillary or peduncled pubescent cymes; bracts ovate, deciduous; pedicels 3-4 in. long *Calyx* ·5 in. long, tubular, widened upwards; segments lanceolate-acute. *Corolla* 3·2 in. long; tube 1·4 in.; lobes spreading, obovate, up to 2 by 1·5 in.; clavate-lanceolate. *Follicles* double, 10-16 by ·6-·75 in., often cohering by the tips, triquetrous, beak incurved. *Seeds* pale-brown, about 1 in. (including beak), ovoid, narrowed into beak, ·4 in. long, surrounded by a white silky coma 2·5 in. long.

GOALPARA, CACHAR, KHASI & JAINTIA HILLS, 4,000 ft., Yield a kind of Caoutchouc.

Flrs. 6-7. Fr. Cold season.

2. Chonemorpha Griffithii *Hook. f.* Vern. Boma-*bondung,* Mech; *Langno-rikang,* Mik.; *Thar-sohwan,* Khasi.

A large evergreen woody climber. *Bark* grey, splitting vertically, ·25 in. thick, white inside with brown streaks, exuding copious milky juice; extremities pubescent or tomentose. *Leaves* 6-14 by 5-10 in., ovate, obovate or orbicular, obtuse or mucronate, coriaceous, glabrescent above, pubescent beneath; lateral nerves 10-14 on either half, quite

strong, prominent beneath; reticulation more or less transverse; base rounded or sub-cordate; petiole ·5-1 in. long. *Flowers* 2-3 in. across, white with a pale yellow centre in 3-chotomous terminal pubescent cymes. *Calyx* segments 5, distinct, about ·5 in. long. *Follicles* 2, (or by abortion single), sub-parallel, straight, green, shining, terete (drying trigonous), 11-16 in. long, hard, angled, beak recurved. *Seeds* pale-brown, ·7 in. long, ovoid, narrowed into a beak, ·2 in. long, crowned by a pale white silky coma, 2-3 in. long.

N.-E. FRONTIER TRACT, N. C. HILLS, GOALPARA, KHASI HILLS, (4,000 ft.).
Yield a kind of Caoutchouc.

Flrs. 7. Fr. Cold season.

21. ECDYSANTHERA Hook. et Arn.

Ecdysanthera micrantha *A. DC.* Modern name Parabarium micranthum (Wall) Pierre. Vern. *Mie-ja-pharoan*, Khasi; *Dhopalat*, Ass.

A large woody climber; branches slender, pendulous, lenticellate, slightly puberulous. *Bark* white, rough; blaze white mottled yellow, exuding milky latex. *Leaves* opposite, 2-7 by 1-2·5 in., ovate-oblong or oblong-lanceolate, obtusely acuminate or caudate-acuminate, rather thinly coriaceous, usually glabrous; midrib impressed above; lateral nerves 4-6 on either half, slender, arcuate; base acute, cuneate or obtuse; petiole ·2-·8 in., twisted. *Flowers* small, yellow in puberulous, stoutly peduncled, large panicled 3-chotomous cymes up to 10 in. long. *Calyx* very small, 5-fid; segments ovate, slightly pubescent. *Corolla* glabrous, urceolate; lobes falcate. *Anthers* obtuse, conniving over and adnate to the stigma. *Disc* annular. *Ovary* of 2 distinct carpels, puberulous, longer than the disc; stigma obpyriform. *Follicles* 3-4 by ·75 in., spreading nearly horizontal, narrowed from above the base to an acuminate point, thickly coriaceous; endocarp shining, crustaceous. *Seeds* ·75 in. long, compressed, pubescent, elliptic-lanceolate, crowned by white caducous silky coma up to 2·5 ft. long and a persistent ring of short

tawny bristly hairs; albumen scanty; cotyledons foliaceous; radicle short, cylindric.

LAKHIMPUR, SIBSAGAR, KHASI HILLS.

Flrs. 3-4. Fr. Cold season.

22. AGANOSMA G. Don.

Stout evergreen climbing shrubs. *Leaves* opposite. *Flowers* in terminal or axillary tomentose cymes. *Calyx* divided nearly to the base; segments 5, narrow-lanceolate with subulate glands at the base. *Corolla* salver-shaped, lower part of tube short, cylindric, upper part wider, bearded with longitudinal villous bands; lobes overlapping to the right. *Stamens* at the base of the upper part of the corolla tube, included; anthers sagittate, rigid, connivent over and adnate to the stigma, spurred at base. *Disc* cupular, 5-lobed. *Ovary* of 2 distinct usually hirsute carpels; style short, unshaped at top; stigma columnar; ovules many. *Follicles* terete, straight or curved, sometimes cohering at the tip. *Seeds* glabrous, ovate or linear-oblong, flattened, not beaked, crowned with a deciduous silky coma; albumen scanty; cotyledons oblong; radicle short, superior.

Calyx segments about ·3 in. long, shorter than corolla tube. Ovary half sunk in the disc. Ovary glabrous. Cymes chiefly axillary. Leaves 2·5-4 by ·7-1·5 in.	1. *A. marginata.*
Calyx segments ·6 in. long or more, longer than the corolla tube. Ovary half sunk in the disc. Ovary pubescent. Cymes terminal:—	
Leaves rather coriaceous; lateral nerves 3-5 on either half. Cymes lax pubescent.	2. *A. caryophyllata.*
Leaves membranous; lateral nerves 8-10 on either half. Cymes glabrescent.	3. *A. gracilis.*
Leaves rather coriaceous; lateral nerves 6-7 on either half. Cymes dense tomentose. ..	4. *A. cymosa.*

1. Aganosma marginata *G. Don.*

An evergreen large shrub; branches stout, prominently warty, stem stout, twisted; branchlets lenticellate, extremities pubescent. *Leaves* 2·5-4 by ·7-1·5 in., linear-oblong, oblong-lanceolate or elliptic-oblong, bluntly acuminate, rather

coriaceous, glabrous above, obscurely puberulous beneath; midrib impressed above, slightly channelled; lateral nerves 9-12 on either half (with slender and shorter intermediate ones) joined by a prominent looped intramarginal vein away from the margin of the blade. *Flowers* white, in more often axillary puberulous lax cymes. *Calyx-segments* ·25 in., lanceolate-acuminate. *Corolla* tube ·25-·3 in. long, slender, lobes twice as long. *Ovary* glabrous. *Follicles* double, up to 20 by 3 in. long. *Seeds* blackish, linear-oblong with one acute end, hooked; coma 2 in. long on the blunt tip.

SYLHET.

Flrs. 6-7. Fr. Cold season.

2. Aganosma caryophyllata *G. Don.* Modern name Aganosma dichotoma (Roth) K. Schum. Vern. *Khirishompa-doukha*, Kach.

A large woody climber with milky latex. *Bark* covered with brown fissured cork; inside light reddish-white. *Leaves* 1·5-4·5 by 1-2·5 in., ovate or elliptic-obtuse, shortly acuminate, rather coriaceous, glabrous or tomentose beneath; lateral nerves impressed above, slender, 3-5 on either half, oblique; base rounded or acute; petiole ·2-·4 in. long. *Flowers* large white, 1·5 in. across in lax pubescent corymbose cymes. *Calyx* segments linear-lanceolate, glandular within, tomentose outside, spreading, ·6 by ·12 in., pale white or dull green. *Corolla* tube ribbed, tapering to throat about as long as the calyx segments; lobes snow-white, 1·25-1·5 by ·25 in., falcate, twisted to the left, overlapping to the right, inner margin often crisped; throat slightly hairy, pale yellow; anthers apiculate, forming a cone at the base of corolla tube, sessile or nearly so. *Disc* large, concealing the ovary. *Follicles* densely woolly tomentose, variable. *Seeds* flat, ·6-1 in. long, hollowed near the tip; coma larger.

N. C. HILLS, NOWGONG.

Flrs. 5. Fr. Cold season.

3. Aganosma gracilis *Hook. f.*

A climbing shrub with slender stems and branches. *Leaves* elliptic-acuminate, membranous, glabrous; lateral

nerves 8-10 on either half, slender, arching. *Flowers* in terminal corymbose cymes, glabrescent; pedicels slender, long. *Calyx-segments* 1·5 in. long, linear-hoary. *Corolla* tube ·7-·8 in. long; lobes 1·5 in. long, oblique-oblanceolate.

KHASI HILLS (3,000 ft.).

No specimen in Forest herbarium, Shillong.

4 Aganosma cymosa *G. Don.*

A stout rambling climber, glabrous; young parts tomentose. *Leaves* 2-4 by 1·2-1·9 in., elliptic-oblong or elliptic-lanceolate, acute or sharply acuminate, glabrous; lateral nerves 5-7 on either half, slender; base acute or cuneate; petiole ·3-·5 in. long. *Flowers* in dense terminal tomentose cymes. *Calyx* teeth ·2-·5 in. long. *Corolla* tube ·16-·3 in. long; lobes ·2-·3 in., ovate-acuminate. *Ovary* hirsute. *Follicle* divaricate, 4 in. long.

SYLHET.

Flrs. 4-7. Fr. 8-11.

23. RHYNCHODIA Benth.

Rhynchodia Wallichii *Benth.* Modern name Rhynchodia rhynchosperma (Wall) K. Schum. Vern. *Gohinga,* Ass.

A large woody climbing shrub. *Bark* blackish, ·12 in. thick, warty; blaze white with brown vertical lines, exuding milky juice; branchlets rough, lenticelled; leaf scars prominent. *Leaves* opposite or ternate, 3-8 by 1·5-4 in., elliptic-ovate or elliptic-oblong, cuspidate, shortly acuminate or acute, rather thinly coriaceous, glabrous; lateral nerves distinct, 7-11 on either half, sub-parallel, looped into a rather obscure intramarginal nerve; tertiaries prominently reticulated; base cuneate or rounded, often unequal; petiole ·2-1 in. long. *Flowers* fragrant, showy, white in lax axillary or sub-terminal puberulous paniculate cymes, secondary branching subumbellate; pedicels ·5 in. long; buds clavate. *Calyx* glandular within, campanulate; segments sparsely pubescent, oblong-lanceolate, obtuse, margin reflexed. *Corolla* tube (and throat pinkish); tube inflated, angled, ·3 in. long; throat

contracted, villous within; lobes obovate, twisted. *Anthers* sagittate, connivent round and adnate to the stigma. *Disc* cup-shaped, 5-lobed. *Ovary* of 2 distinct carpels; ovules many; stigma columnar. *Follicle* pendulous, 12-18 in. long. *Seeds* ovate-oblong, narrowed into a long beak, ·8 in. long; crowned by a white silky deciduous coma up to 2·5 in. long, exalbuminous; cotyledons oblong; radicle short, superior, cylindric.

LAKHIMPUR, SIBSAGAR, GOALPARA.

Flrs. 3-5. Fr. Cold season.

24. ANODENDRON A. DC.

Anodendron paniculatum *A. DC.* Modern name Anodendron manubriatum (Wall) Merr.

A very large woody climber; stem stout. *Bark* smooth, greyish black or brownish; blaze white with brown patches (Haines). *Leaves* 3·5-6 by 1·5-2·5 in., elliptic or oblong, cuspidate, coriaceous, shining above, glabrous; lateral nerves 12-15 on either half, slender; base usually rounded; petiole stout, ·25-·65 in. long. *Flowers* small, pale yellowish in large 3-chotomous axillary and terminal panicled cymes. *Calyx* glabrous, 5-cleft; segments ovate-acute. *Corolla* tube short, throat hairy; lobes linear, obtuse, falcate, twisted, overlapping to the left in bud. *Anthers* connivent round the stigma and adnate to it. *Ovary* of 2 distinct carpels sunk in the disc. *Follicles* divaricate, through an angle of 150°-160°, terete, glabrous, narrowed to an obtuse point. *Seeds* up to 12, compressed, 1·2 in. long, ovate-elliptic with a long straight slender beak, crowned by a white silky coma up to 2 in. long.

GOALPARA.

It s said to produce rubber.

Flrs. 3-4. Fr. 1.

25. TRACHELOSPERMUM Lemaire.

Climbing shrub. *Leaves* opposite with an interpetiolar bristly ridge. *Flowers* white or pinkish, in lax terminal and pseudo-axillary cymes. *Calyx* small, 5-partite, with scales or glands at the base within. *Corolla* salver-shaped; mouth constricted; lobes 5, oblique, twisted, overlapping to

the right. *Stamens* united above the middle of the tube; included or shortly exserted; filaments short, broad; anthers connivent over and adhering to the stigma; cells spurred. *Disc* annular or glandular. *Ovary* of 2 distinct carpels; style slightly expanded at the top; stigma columnar; ovules numerous. *Follicles* elongate, slender, terete. *Seeds* linear, not beaked, crowned by long dense coma; albumen copious; cotyledons linear-flat; radicle short, superior.

Cymes long peduncled. Corolla tube larger than the calyx, much wider near the mouth; stamens inserted in the upper portion :—		
Corolla glabrous. Anther-tips exserted. ..	1.	*T. gracilipes.*
Corolla pubescent. Anthers included. ..	2.	*T. fragrans.*
Cymes short-peduncled. Corolla tube short not much wider near the mouth. Stamens inserted in the lower portion. Anthers included. ..	3.	*T. axillare.*

1. Trachelospermum gracilipes *Hook. f.*

A climber, glabrous. *Leaves* 1·2·5 by ·5-1 in., elliptic-acute, sub-coriaceous, glabrous; lateral nerves 7-9, slender, looped into an inter-marginal nerve; petiole ·1-·2 in. long. *Flowers* ·6 in. across, in loose corymbose cymes; pedicels very slender, ·25 in. long. *Calyx* segments ovate-lanceolate, sub-acute with laciniate scales at the base. *Corolla* glabrous; tube ·25 in. long, contracted at the mouth; lobes obliquely oblong, ·25 in. long. *Anther* tips apiculate protruding beyond the corolla. *Disc* of oblong glands. *Fruit* not seen.

SIBSAGAR, KHASI & JAINTIA HILLS.

Flrs. 4.

2. Trachelospermum fragrans *Hook. f.* Modern name Trachelospermum lucidum (D. Don) K. Schum. Vern. *Puraitimit,* Miri; *Akhahilata,* Ass.; *Chiri-nai-nai-rikang,* Mik.; *Soh-kyrmoit-kroh,* Khasi.

A large woody climber. *Bark* blackish warty, thin; blaze yellowish, exuding milky juice; large stems tubercled appearing to be spinous; branchlets pendulous. *Leaves* 2-5 by ·5-1·5 in., elliptic-oblong or elliptic-lanceolate, acuminate, sub-coriaceous, glabrous, shining above, paler beneath; lateral nerves 10-15 on either half; petiole ·15-·5 in. long, puberu-

lous, glandular in the axils. *Flowers* white, fragrant, in lax trichotomous pedunculate panicled cymes. *Corolla* salver-shaped with a campanulate mouth; tube ·35 in. long; lobes oblong, hairy at the base, unequal sided, twisted to the left, overlapping to the right. *Disc* glandular, quadrate. *Follicles* 5-15 in. long, cylindrical, acuminate, incurved. *Seeds* ·7 in. long, linear, flattened, crowned by a copious coma of white hairs up to 1·3 in. long.

N.-E. FRONTIER TRACT, LAKHIMPUR, SIBSAGAR, N. C. HILLS, KHASI & JAINTIA HILLS (5,000 ft.).

Flrs. 3-6. Fr. 11-2.

3. Trachelospermum axillare *Hook. f.* Vern. *Mium-kyrmid,* Khasi.

A stout climber, quite glabrous; old branches lenticelled. *Leaves* 2·5-5 by 1-1·5 in., elliptic-oblong or oblanceolate-acuminate, coriaceous and glabrous; lateral nerves 13 on either half; base joined with an obscure inter-marginal nerve; base obtuse or cuneate; petiole ·1-·3 in. long. *Flowers* purplish in axillary sub-sessile cymes; pedicels up to ·6 in. long. *Calyx* segments ovate-ciliate, ·15 in. long. *Corolla* ·2 in. long; lobes linear-oblong-obtuse; glands glabrous. *Ovary* pubescent. *Follicles* rusty-tomentose, cylindric, curved, 6-8 by ·4 in. *Seeds* ·75 in. long, slender, crowned by a copious tawny coma 2 in. long.

Shillong Peak (K. & J. HILLS).

Flrs. 7. Fr. Autumn season.

Trachelospermum auritum *Schneider.*

A scandent shrub; branches fistulose. *Leaves* 3·4-7·2 by 1·5-3·7 in., broadly elliptic or somewhat obovate, entire, shortly caudate-acuminate, membraneous, strigosely ciliate; lateral nerves about 10 on either half; base cordate; petiole short ·1-·4 in. long. *Inflorescence* terminal; bracts lanceolate, pilose. *Calyx-segments* linear-lanceolate ·12-·17 in. long. *Corolla* white, hypocrateriform; tube about ·6 in. long with constricted base; lobes oblong, spathulate. *Ovary* villose at the apex; disc 5-lobed; style fine; stigma somewhat oblong. *Follicles* 6·5 in. long, ·6 in. broad, divergent; apex somewhat racemed; seeds ·8 in. long, coma 1·5-1·7 in. long, purplish-brown.

KHASI HILLS, MANIPUR.

26. ICHNOCARPUS Br.

Ichnocarpus frutescens *Br.* Vern. *Lamkandol,* Manip.; *Paharukibandan,* Mech.

A large dextrorse twiner. *Bark* reddish-brown with circular raised lenticels, extremities rusty tomentose. *Leaves* 2-4 by 1-2 in., elliptic or elliptic-oblong, acuminate or acute, sub-coriaceous, glabrous and dark-green above, more or less rusty pubescent beneath specially along the nerves; petiole ·2-·3 in. long with an intra-petiolar ridge. *Flowers* greenish white, fragrant, ·2-·5 in. across in axillary or terminal cymes, often forming leafy panicles; bracts minute. *Calyx* pubescent, 5-cleft, glandular inside; segments ovate-oblong. *Corolla* salver-shaped; tube ·1-·15 in., dilated inside round the included anther; throat contracted, villous; lobes 5, narrowed, ciliate, overlapping to the right. *Anthers* sagittate, bluntly spurred, conniving over and adhering to the stigma. *Disc* minutely lobed. *Ovary* of 2 distinct carpels; style short; stigma thick, oblong, jointed to an elongate conical tip; ovules many. *Follicles* 3-6 by ·5 in., slender, cylindrical, straight, usually double, rusty tomentose when young. *Seeds* numerous, ·5-·7 in. long, linear with a scanty short coma.

SIBSAGAR, KAMRUP, NOWGONG, SYLHET, CACHAR, GARO HILLS, GOALPARA.

Baskets and fishing traps are made of the switchy branches. The root is used as a substitute for Sarsaparilla. The stalks and leaves are used in the form of a decoction in fevers. (I. M. Plants).

Flrs. 4-6. Fr. 10-12.

27. MICRECHITES Miquel.

Microchites elliptica *Hk. f.*

A large climbing shrub. *Bark* pale brown; branches obscurely ribbed. *Leaves* 2·5-5 by 1-2 in., elliptic-lanceolate or elliptic-oblong, shortly acuminate, chartaceous, glabrous, reddish; lateral nerves slender, numerous; base acute or rounded, slightly oblique; petiole ·3-·5 in. long. *Flowers* small in axillary or terminal pubescent thyrsoid cymes. *Calyx* 5-fid, glandular within; segments pubescent outside, ovate-oblong, obtuse. *Corolla* salver-shaped; tube

·17 in. long; lobes 5, oblique, overlapping to the right. *Stamens* included; anthers sagittate conniving round the stigma and adnate to it; cells spurred at the base. *Ovary* of 2 distinct carpels; stigma clavate. *Follicles* divaricate, sub-cylindric, lanceolate, 4 by ·8 in., obscurely ridged when dry. *Seeds* blackish, flat, oblong (not beaked) concave, ·45-2 in., coma deciduous, silky, 1·2 in. long.

KHASI & JAINTIA HILLS (4,000 ft.).

Flrs. 7. Fr. 12.

FAM. 86. ASCLEPIADACEÆ.

Herbs or shrubs frequently climbing with milky acrid juice. *Leaves* opposite, rarely alternate, sometimes wanting, entire, exstipulate. *Flowers* regular, hermaphrodite, 5-merous, usually in umbelliform cymes. *Calyx* inferior, deeply divided; segments imbricate, usually with minute process or glands at the base within. *Corolla* various, hypogynous; tube usually short, often furnished with processes or hairs within or at the mouth (corolline corona); lobes valvate, imbricate or contorted, often recurved and connate at the tips. *Stamens* inserted at or near the base of the corolla and alternating with the lobes; filaments flat, rarely free, usually connate in a tube round the ovary (staminal column), the apex of the tube often united to the dilated part of the combined styles and usually with fleshy scales or processes on the back (staminal corona); anthers 2-celled, margins of the anthers or their basal processes more or less horny or usually projecting downwards as wings on the staminal column, the adjacent wings of each pair nearly meeting; connectives of the anthers often produced into membranous and sometimes connate tips; pollen forming 1 or 2 granular

masses in each cell; the pollinia of the adjoining cells or 2 contiguous; anthers united in pairs or fours to a gland (corpuscle) which lies on the edge of the dilated portion of the style between the anthers. *Ovary* of 2 distinct superior carpels enclosed within the staminal column; style 2, short, united above into a large stigma, usually 5-angled, included between the anthers or produced beyond into a long or short, simple or bifid column; ovules many, multiseriate on the projecting placentæ. *Fruit* usually of 2 follicles, sometimes 1 by suppression. *Seeds* compressed, usually flat, often marginal, crowned with a coma or long silky-hairs; albumen straight; cotyledons flat; embryo large.

Filaments free. Pollinia granular in pairs in each :—

Coronal scale 0. Anthers bearded. .. **1. Pentanura.**

Corona corolline :—

Corolla small or middle sized, greenish. .. **2. Cryptolepsis.**

Corolla large, subcampanulate, purple. .. **3. Cryptostegia.**

Corona staminal :—

Cymes short, sessile. Corolla-lobes ovate. **4. Streptocaulon.**

Cymes loosely panicled. Corolla-lobes lanceolate. .. . . **5. Myriopteron.**

Coronal scales connate into a lobed ring. Corolla rotate. .. .. **6. Periploca.**

Filaments connate. Pollinia waxy :—

Anthers with a membranous tip.

Pollinia pendulous from the corpuscle :—

Pollen masses in pairs in each cell. Corolla rotate; lobes overlapping to the tip. .. .. **7. Toxocarpus.**

Pollen masses solitary in each cell :—

Corona both corolline and staminal. .. **8. Oxystelma.**

Corona staminal (5 processes) adnate to the anthers; pollinia pendulous from the corpuscle :—

Erect, leafy:—

Coronal process spreading, fleshy sculptured. .. .. .. **9. Calotropis.**

Coronal process spathulate. .. **10. Asclepias.**

Corona single staminal. Corolla campanulate, large, white. .. .. **11. Raphistemma.**

Corona of 10-lobed ring and 5 horny processes. .. .. .. **12. Holostemma.**

Corona annular. .. .. .. **13. Cynanchum.**

Pollen masses erect. rarely horizontal or pendulous. Anthers usually with a membranous inflexed apex. Corolla lobes overlapping:—
Corona single, corolline of pubescent ridges. .. .. **14. Gymnema.**
Coronal process adnate to the staminal column:—
Coronal scales simple, minute; corolla more or less campanulate. .. .. **15. Marsdenia.**
Coronal scales rounded. Corolla more or less salver-shaped. .. .. **16. Telosma.**
Coronal process minute or 0:—
Corolla urceolate. .. .. **17. Gongronema.**
Corolla rotate:—
Flower middle-sized. Coronal processes stellately pubescent. Pollinia oblong. .. .. .. **18. Dregea.**
Flowers small. Coronal processes tubercled. Pollinia oblong. .. **19. Tylophora.**
Flowers large. Coronal processes simple, ovate-obtuse. Cymes umbelliform. .. .. .. **20. Treutlera.**
Corolla valvate:—
Corolla minute, urceolate. Coronal scales membranous, erect. .. **21. Dischidia.**
Corolla rotate. Coronal scales stellate. Stigma truncate, 5-angled. Pollen masses sessile. .. .. **22. Heterostemma.**
Corolla rotate. Corona very large, stellately spreading. Stigma flat or apiculate at the centre. Pollen masses pedicelled. .. .. **23. Hoya.**
Anthers without a membranous apex. Pollinia sessile, erect, 1 in each cell. Corona staminal. Corolla tube long. Twining shrub. .. .. **24. Ceropegia.**

1. PENTANURA Blume.

Pentanura khasiana *Kurz.*

A twining glabrous shrub. *Leaves* 3-5 by ·8-1·5 in., elliptic or elliptic-lanceolate, acuminate, coriaceous, glabrous; lateral nerves 7-10 on either half, conspicuous, arcuate; midrib stout; tertiaries finely reticulated; base acuminate or cuneate; petiole ·4-·8 in. long. *Flowers* in shortly peduncled axillary fascicles. *Calyx* 5, glandular within, ovate-

lanceolate, about ·1 in. long. *Corolla* sub-campanulate; lobes purplish, sparsely pubescent within, ovate-lanceolate, acute, ·35 in. across. *Corona* absent. *Filaments* free; anthers arching adnate to the stigma; pollen granular; pollen masses flabellate, stipitate in pair on the corpuscles; connective produced into a spathulate appendage which is bearded. *Style* apex capitate, 5-angled. *Follicles* divaricate, ·3 in. long, incurved, obtuse. *Seeds* ending in tufted silky coma.

KHASI HILLS (up to 4,000 ft.).

Flrs. 6-7. Fr. 10.

2. CRYPTOLEPSIS Br.

Twining shrubs, glabrous. *Flowers* in slender lax terminal or axillary few-flowered pedunculate cymes; bracts and bracteoles small. *Calyx* deeply segmented with 5-scales within. *Corolla* tube short, cylindric or campanulate; lobes narrow, overlapping and twisted to the right. *Corolline* corona of 5-linear or clavate conniving scales inserted near or above the middle of the tube. *Filaments* sub-connate at their broad bases; anthers with conniving acuminate tips; pollinia cohering in pairs in each cell, granular with oblong appendages. *Stigma* broadly conical. *Follicles* divergent, terete.

Lateral nerves parallel. Corolla ·7 in. across Calyx-segments acute. Follicles stout, 4 in. or less.	*1. C. Buchanani.*
Lateral nerves not parallel. Corolla 1-1·5 in. across. Calyx-segments obtuse. Follicles very slender, 5 in. or more.	*2. C. elegans.*

1. Cryptolepsis Buchanani *R. & Sch.* Vern. *Garanggisim-dukha,* Kach.; *Rhui-wong,* Kuki; *Durikhal,* Garo; *Kombat-ngiang-pur,* Khasi.

A large dextrorse evergreen twiner with copious milky-juice. *Bark* smooth, copper-coloured, peeling off in papery rolls in old stems. *Branches* lenticellate. *Leaves* 3-6 by ·8-2·5 in., oblong-elliptic or elliptic-oblong, acute or obtuse, abruptly shortly acuminate, apiculate, coriaceous, smooth and glossy above, glaucous beneath; lateral nerves trans-

verse, parallel, terminating in an intramarginal vein; base usually acute; petiole up to ·5 in. long. *Flowers* pale-yellow in lax dichotomous cymes, often panicled; peduncles ·3-1 in. long; pedicels ·1-·2 in. long; bracts ovate-lanceolate. *Calyx* segments ovate-acute. *Corolla* ·7 in. across. *Follicles* 2-4 by ·5-·7 in. stout, divaricate, tapering and pointed at the apex. *Seeds* compressed, oblong-ovate, about ·25 in. long; coma about 1 in. long.

GOALPARA, GARO HILLS, N. C. HILLS, KAMRUP, DARRANG, NOWGONG, KHASI HILLS.

Flrs. 5-6. Fr. Cold season.

The milky-juice coagulates into a caoutchouc-like substance and is also believed to heal sores (N. C. Hills).

2. Cryptolepsis elegans *Wall.* Vern. *Kinik-riube,* Miri.

A dextrorse climber. *Bark* brownish. *Branchlets* long, slender, brown; blaze exuding sticky latex. *Leaves* 1-3 by ·5-1·5 in., elliptic or ovate, oblong or oblong-lanceolate, obtuse or acute with a cusp, glabrous, dark-green and shining above, glaucous beneath; lateral nerves not parallel; base rounded, cuneate or subcordate. *Flowers* in axillary or terminal cymes. *Calyx* segments obtuse. *Corolla* 1·1·5 in. across. *Follicles* divergent through an angle of about 180°, 5 by ·25 in.; coma about 2 in. long, finely silky white.

CACHAR, GOALPARA, SIBSAGAR, LAKHIMPUR, KHASI HILLS.

Flrs. 6-7. Fr. Cold season.

Branchlets used for making fishing traps.

3. CRYPTOSTEGIA Br.

Cryptostegia grandiflora *Br.*

A large stout glabrous climber. *Leaves* 3-4 by 1·5-2 in., elliptic, obtuse, coriaceous, shining; nerves arcuate, faint; base acute; petiole ·5-·6 in. long. *Flowers* large in terminal trichotomous cymes; bracts caducous. *Calyx*-segments lanceolate, ·5-·6 in. *Corolla* campanulate, light purplish, about 2 in. across; lobes broad, overlapping and twisted to the right. *Corona* corolline at the base of the

throat. *Anthers* acute; pollinia in pairs in each cell granular, with sub-spathulate appendages. *Stigma* convex. *Follicle* 4-5 in. long, thick, woody, divaricate, 3-winged; seeds comose.

Cultivated in gardens; native of AFRICA or of MADAGASCAR.

Flrs. and Fr. Hot season and rainy season.

4. STREPTOCAULON Wight & Arn.

Streptocaulon sylvestre *Wight.*

A handsome perennial with woody rootstalk, prostrate, pubescent. *Leaves* ·5-1·5 by ·4-1·2 in., suborbicular or broadly ovate, tipped with a short cusp, membranous, pubescent; base rounded or subcordate; petiole ·05-·1 in. long. *Flowers* small in panicled cymes. *Calyx* 5-partite, glandular within. *Corolla* 5-lobed; lobes short, ovate, overlapping to the right. *Corona* of 5-scales adnate to the back of the filaments. *Filaments* with interposed teeth or glands. *Follicles* smooth. *Seeds* comose.

ASSAM (Mann's No. 116).

Flrs. 5.

5. MYRIOPTERON Griff.

Myriopteron extensum (*Wt.*) *K. Schum.*=M. paniculatum Griff. Vern. *Chhagal-singa-lata,* Kamrup; *Ngyaniong-doukha,* Kach.

A slender climbing shrub with milky-juice. *Leaves* 3-5 by 1·5-2·5 in., suborbicular-oblong or elliptic-acute or bluntly acuminate, membranous, sparsely puberulous above, finely pubescent beneath; lateral nerves 5-8 on either half; base rounded or acute; petiole slender, ·5-1·5 in. long. *Flowers* in few-flowered cymes. *Calyx* 5-partite, minutely glandular within. *Corolla* rotate, ·3 in. across; lobes overlapping to the right, twisted to the left. *Coronal* scales 5 on the back of the filaments. *Filaments* connate in a ring below; anthers connivent above and adnate to the stigma, tips membranous; pollen masses in pairs in each cell, appendage of the corpuscles bifid. *Follicles* 2, turgid, straight with many longitudinal wings narrowed to the tip.

Seeds ·3 in. long, concave, ribbed ventrally; coma about 1·25 in. long.

KAMRUP, N. C. HILLS.

Flrs. 6-7 (?) Fr. Cold season.

6. PERIPLOCA Linn.

Periploca calophylla *Falc.* Vern. *Meisoh-phrap-iong, Mei-reng-sai, Mei-ang-sla,* Khasi.

A large glabrous evergreen climber with milky-juice. *Bark* purplish-brown exfoliating in thin flakes; blaze white, exuding sticky latex. *Leaves* 2-5 by ·2-· in., linear-lanceolate, long, acuminate, coriaceous, shining above; lateral nerves numerous, parallel, united to form an intramarginal vein; petiole ·05-·2 in. long. *Flowers* faintly scented, brown, stellate hairy, ·3 in. across in lax cymes. *Calyx* glandular toothed. *Corolla* ·25-·3 in. across; lobes greenish-yellow or pinkish, villous inside. *Corona* of 5 thick scales connate into a 10-lobed ring, usually furnished with 5 filiform aristas. *Stamens* free; filaments short; anthers bearded at the back and cohering laterally; pollen granular. *Stigma* convex. *Follicles* 5-6 by ·25-·3 in., smooth, tapering to blunt point, usually in pairs, divaricate at an angle of 40°-50°. *Seeds* ·5-·7 in long; coma about 1 in. long.

KHASI HILLS.

Flrs. 10-11. Fr. 4.

7. TOXOCARPUS Wight & Arn.

Twining shrubs. *Flowers* small in axillary pedunculate, paniculate or racemed cymes. *Calyx* small, 5 partite with or without minute scales within. *Corolla* salver-shaped; tube short, 5-lobed; lobes linear-oblong, overlapping to the left. *Corona* processes attached to the staminal tube, flattened. *Filaments* connate; anthers small, minutely fimbriate at tip, erect or connivent round the style apex; pollen masses very minute, pendulous, apparently in pairs in each, all attached to minute pale soft pollen-carriers without caudicles. *Ovary* of 2 carpels; style slender; style-apex produced beyond the staminal column. *Fruit* of 2 divaricate follicles. *Seeds*

oblong, flattened, tipped with a silky coma; cotyledons oblong, radicle cylindric.

Corolla lobes hairy within at the base. Coronal scales overlapping the anther cells; stigma unequal, 2-fid.	1. *T. himalensis.*
Corolla lobes entirely glabrous. Coronal scales triangular, shorter than the column; stigma long, fusiform.	2. *T. acuminatus.*

1. Toxocarpus himalensis *Falc.*

A small evergreen climber; young parts rusty tomentose. *Leaves* 3-5 by 1-2·5 in., lanceolate, broad-elliptic, elliptic-oblong, bluntly acuminate, pubescent; base rounded, subcordate or acute; petiole ·5-·6 in. long. *Cymes* rusty, 1-seriate. *Calyx* rusty pubescent. *Corolla* membranous, villous within at the base. *Coronal* scale overlapping the anther cells. *Follicles* rusty-pubescent, 4-5 in. long; coma 1·7 in. long.

KHASI HILLS, ASSAM.

Flrs. 4-5.

2. Toxocarpus acuminatus *Benth.*=Goniostemma acuminatum Wight.

Stem glabrous. *Leaves* 4-5 by 1-1·5 in., elliptic-lanceolate, glabrous, glossy on both surfaces. *Cymes* absent, glabrous. *Calyx* small, rounded. *Corolla* quite glabrous; lobes with a triangular scale adnate to the base. *Follicles* 5 by ·7 in.

SYLHET.

Flrs. 4-5. Fr. 9-10.

8. OXYSTELMA Br.

Oxystelma esculentum *Br.*

A perennial twiner; stem much branched, slender, glabrous. *Leaves* 1·5-5 by ·2-·3 in., linear or linear-lanceolate, acute or acuminate, membranous, deciduous, pale-green, puberulous or glabrescent; base usually acute; petiole ·1-·5 in. long. *Flowers* 1 in. across, large, showy, drooping in

pedunculate few flowered cymes; pedicels filiform, ·5-·8 in. long. *Calyx* small, glandular within. *Corolla* pale rosy. about 1 in. across with a pubescent annular corolline; staminal corona of 5-scales, ovate-lanceolate; lobes with 2 keels adnate to the base of the staminal columns. *Anthers* with inflexed membranous deltoid tips; pollen-masses pendulous, 1 in each cell. *Follicles* 1·5-3 by ·3 in., glabrous, tapering. *Seeds* very numerous, flat, ovate, black; coma about ·8 in. long.

SIBSAGAR, LAKHIMPUR (Rangagora).

A decoction of the plant is used as a gargle in ulcerations of the mouth and in sore-throat. In combination with turpentine it is prescribed for itch. The fresh roots are held in Orissa to be a specific for jaundice (I. M. Plants).

Flrs. 8. Fr. Cold season.

9. CALOTROPIS Br.

Erect, hoary or glabrous shrubs, undershrubs or herbs, rarely sub-arboreous. *Leaves* thick and fleshy broad. *Flowers* 5-merous, large or medium-sized in umbellate or subracemose pedunculate cymes. *Calyx* glandular within. *Corolla* broadly campanulate or sub-rotate; lobes broad valvate. *Corona* of 5-scales radiating from the staminal column, fleshy, laterally compressed with dorsal spines. *Anther* tips membranous, inflexed; pollinia 1 in each cell, waxy, pendulous, stipitate. *Style-apex* depressed, 5-angled or lobed. *Follicles* short, thick. *Seeds* ovate; coma slender, silky.

Shrubs. Leaves subsessile:—		
Coronal scales truncate. Buds ovoid. Corolla lobes spreading, lavender lilac or bluish purple.	1.	*C. gigantea.*
Coronal scales acute. Buds hemispheric. Corolla lobes at first erect with purple blotch at the tip.	2.	*C. procera.*
Herb or undershrub. Leaves petiolate. Coronal scales bilobed.	3.	*C. Acia.*

1. Calotropis gigantea *Br.* Vern. *Wai-bulai-gedeba, Arka,* Sans.; *Akanda,* Beng.; *Akon,* Ass.

A large shrub, sometimes almost a small tree; blaze yellow, exuding latex. *Bark* deeply cracked, corky when of

sufficient size; young parts and undersurface of leaves covered with white floccose tomentum. *Leaves* sub-sessile, 4-8 by 1·5-4 in., ovate or oblong-acute, shortly acuminate or obtuse, coriaceous, glabrate when mature; base cordate with auricled lobes. *Flowers* 1·5-2 in. across, lavender lilac or bluish purple in axillary and terminal umbellate or sub-corymbose cymes covered with hoary floccose tomentum. *Buds* ovoid. *Corolla* lobes spreading. *Follicles* 3-4 by 1-1·5 in., recurved, turgid. *Seeds* ovate, minutely pubescent, ·25 in. long.

DARRANG, N. C. HILLS, KHASI HILLS.

The bast yields the well-known Madar-fibre. The floss is also used as a substitute for silk cotton for stuffing and can also be spun into thread mixed with cotton. The milky juice is regarded as a caustic and drastic purgative and is said to possess various medicinal values. The dried bark of the root is said to be an excellent substitute for Ipecacunha in the treatment of dysentery (I.M.P.). The fresh leaves are applied as dry fomentations for swellings. Pounded leaves are applied on burns (N. C. Hills).

Flrs. & Fr. Probably throughout the year.

2. Calotropis procera *Br.* Vern. *Akon-asing,* Miri; *Alarka,* Sans.

A shrub resembling C. gigantea. *Leaves* 6-9 by 3-5 in. *Flowers* purplish red, faintly scented, ·5-1 in. across. *Buds* hemispheric. *Corolla* lobes erect. *Follicles* similar to above species.

N. E. F. TRACT, DARRANG, K & J. HILLS.

The medicinal properties are similar to those of C. gigantea.

Flrs. & Fr. throughout the year but chiefly by the end of cold season and beginning of hot season.

3. Calotropis Acia *Hamilt.*

Herbs or undershrubs; young parts floccose, tomentose. *Leaves* 5-9 by 2-5 in., obovate, oblanceolate or oblong, abruptly short, acuminate or acute; lateral nerves 6-7 on either half, narrowed into a short petiole, ·25-1 in. long. *Flowers* purplish, about 1 in. across in branched umbellate cymes. *Buds* conical. *Peduncles* up to 2 in. long. *Calyx* lanceolate about ·3 in. long. *Corolla* lobes erect, acuminate

with a bluish or purplish patch near the apex. *Corona* ciliate, 2-lobed. *Follicle* 4 in. long, sub-globose.

GOALPARA, KAMRUP.

Flrs. & Fr. 12-5.

10. ASCLEPIAS Linn.

Asclepias curassavica *Linn.* Vern. *Khim-nana*, Cach.; *Sap-par*, Kuki.

A perennial erect herb. *Leaves* 1-4 by ·3-·8 in., lanceolate or oblong-lanceolate or elliptic-lanceolate, acuminate, membranous; base acute; petiole ·1-·3 in. long. *Flowers* bright, orange red in umbellate cymes. *Calyx* glandular within. *Corolla* rotate, deeply 5-lobed, reflexed. *Coronal scales* 5, erect, spoon-shaped, adnate to the staminal column. *Anther-tips* membranous, reflexed; pollinia 1 in each cell, waxy pendulous, flattened. *Ovary* of 2 distinct carpels. *Follicles* 2·2·5 in. long, smooth, inflated, beaked. *Seeds* flattened; coma silky.

N. E. F. TRACT, N. C. HILLS (Cultivated and escapes).

It is said to be efficacious in dysentery. The root is regarded as a purgative and consequently astringent. It is also a remedy in piles and gonorrhœa.

Flrs. & Fr. 11-5.

11. RAPHISTEMMA Wall.

Raphistemma pulchellum *Wall.*

A large twining shrub; branches herbaceous. *Leaves* 3-8 in., ovate-cordate, acuminate, membranous, glabrescent above, fine pubescent beneath, specially along the nerves; midrib glandular at base; nerves stout, 5-7; petiole 2-5 in. long with glandular stipular line. *Flowers* in pedunculate umbellate cymes. *Calyx* glandular within. *Corolla* white, campanulate, 5-lobed; lobes spreading, over-lapping to the right. *Staminal* corona of 5 scales adnate to the column and are produced into long slender ligules; anthers with an inflexed membranous tip; pollinia solitary in each cell, pendulous, waxy, not compound. *Follicles* thick, solitary, 5 by 1·25 in., turgid, fusiform with a slightly curved beak.

SIBSAGAR (Gaurisagar).

Flrs. Rainy season. Fr. 9.

12. HOLOSTEMMA Br.

Holostemma annulare *K. Schum*=H. Rheedei Wall.

A glabrous, usually much branched twiner. *Leaves* 2-5 by 1·5-3 in., ovate-acute or acuminate, cordate, glabrous above, slightly pubescent, specially along the nerves beneath; midrib usually glandular at the base, usually 5 basal nerved; tertiary nerves fine, reticulate, often red; basal lobes rounded; petioles up to 2 in. long. *Flowers* in peduncled cymes, often umbellate. *Calyx* divided nearly to the base; segments ovate, obtuse, ciliate. *Corolla* 1-1·3 in. across, deeply divided; lobes ovate or oblong-obtuse. *Corona* of a short truncate or slight undulate ring attached to the base of the staminal column; filaments connate; anthers with large wing which are decurrent to the base of the staminal column with membranous inflexed tips; pollinia solitary in erect cell long, stipitate. *Follicles* 4-5 by 1·3-1·5 in., glabrous, tapering to a point; come about 1 in. long.

K. & J. HILLS, GOALPARA.

Flrs. 8-9. Fr. Cold season.

13. CYNANCHUM Linn.

Erect or twining herbs or shrubs. *Leaves* opposite, rarely whorled. *Flowers* 5-merous, greenish or purplish in axillary umbellate racemes or subpaniculate peduncled cymes. *Corolla* rotate; lobes overlapping to the right or valvate. *Corona* adnate to the base of the staminal column, annular, cupular or tubular, variously toothed or toothed with or without scales or tubercles on the inner face opposite to the lobes; anthers sessile or stipitate with membranous reflexed tips; pollinia solitary in each cell, not compressed, pendulous, waxy. *Ovary* of 2 carpels; style apex 5-angled, truncate, rounded or conical. *Follicles* terete, often winged, sometimes clothed with soft spines. *Seeds* plano-convex, tipped with silky coma.

Inflorescence corymbiform cymes:—
  Corolla lobes as long as the corona:—
    Leaves orbicular. .. .. .. 1. *C. corymbosum.*
Inflorescence umbellate cymes:—
  Corolla lobes longer than the corona:—
    Leaves lanceolate .. .. .. 2. *C. Wallichii.*

1. Cynanchum corymbosum *Wight.*

Climber with rather stout stem. *Branchlets* glabrous. *Leaves* 2-5 by 1-2·5 in., ovate or orbicular, cuspidate or acuminate, membranous, dull green above and glaucous beneath, junction of midrib with petiole glandular above; base cordate; petiole 1-3 in. long. *Flowers* in densely corymbiform cymes. *Peduncles* slender. *Calyx* 5-cleft. *Corolla* campanulate; lobes obtuse with somewhat reflexed margins. *Corona* campanulate as long as corolla lobes, irregularly lobed or crenate, plicate. *Follicles* large, usually single, lanceolate, 3-5 by 1·5-2 in., covered with long soft numerous hooked spiny processes. *Seeds* dark-brown, margined, ovate-orbicular, ·5 by ·3 in., wrinkled, dentate, crenate; coma up to 1·5 in. long.

DARRANG, KHASI HILLS, SYLHET, CACHAR.

Flrs. Rainy season. Fr. 1.

2. Cynanchum Wallichii *Wight.*

A twining shrub, glabrous. *Leaves* 1·5-4·5 by ·6-2 in., ovate-lanceolate, acuminate, membranous, glabrous; basal nerves 5-7; base cordate with rounded incurved lobes; petiole ·7-2 in. long. *Flowers* in shortly peduncled umbellate cymes. *Corolla* greenish; lobes oblong-lanceolate, larger than the corona. *Corona* campanulate, plicate; lobes dentate. *Follicles* 4-5 by ·3-·6 in., reddish brown, lanceolate-acuminate. *Seeds* ovate-orbicular, margined, darkish brown, ·4 by ·25 in.; coma 1·75 in. long.

Flrs. 8. Fr. 12.

Cynanchum deltoideum *Hook. f.*

Twiner, almost glabrous; stem slender. *Leaves* 2-3 in. long, and almost as broad, deltoid-cordate, acuminate, membranous, pale beneath; basal lobes broad, rounded; sinus broad; petiole 1-1·5 in. *Flowers* small, glabrous in many flowered umbellate cymes; peduncles slender; pedicels hairy. *Calyx* segments ovate, glabrous. *Corona* 10-lobed, connecting the sessile column; lobes alternately large and small; larger lobes ovate, thickened; smaller lobes rounded, membranous.

KHASI HILLS (Mawflang) 5-6,000 ft. (*F. B. I. IV.* 24).

14. GYMNEMA Br.

Twining shrubs or undershrubs. *Flowers* small in crowded umbelliform cymes. *Calyx* 5-partite. *Corolla* subrotate, campanulate or urceolate; lobes thick, twisted, subvalvate or narrowly overlapping to the right. *Corolline* corona of 5 fleshy processes, adnate to the corolla tube or throat. *Staminal* column short; anther tips small, membranous; pollinia erect, sub-sessile. *Style* apex larrgg, conical, *clavate* or capitate, exserted beyond the anthers. *Fruit* of 2 (or 1) smooth. *Seeds* ovate, margined; coma silky; cotyledons elliptic.

Corolla tube short. Coronal processes protruding more or less from the mouth of the corolla:—	
Leaves tomentose beneath (3·5-6 by 1·8-2·5 in.). Cymes subcapitate.	1. *G. acuminatum.*
Leaves almost glabrous (2-4 by ·7-1·8 in.). Cymes umbellate.	2. *G. lactiferum.*
Leaves glabrous (1·5-4 by 1·2-2·5 in.) except the midrib and the nerves. Cymes binate.	3. *G. latifolium.*
Corolla elongate. Coronal processes not extending to the mouth of the corolla. Leaves glabrous (2·5-6 by 1·5-3·5 in.).	4. *G. tingens.*

1. Gymnema acuminatum *Wall.*

A large climber. *Bark* corky. *Leaves* 3·5-6 by 1·8-2·5 in., ovate or ovate-elliptic, acuminate, glabrous above, tomentose beneath; lateral nerves 5-6 on either half; base rounded; petiole ·4-·8 in. long. *Cymes* subcapitate. *Calyx* segments ovate-acute. *Corolla* pale white, campanulate; lobes rounded, glabrous. *Style-apex* more or less conical. *Follicles* 3 by ·75 in., woody, beaked, cordate at base, tomentose (glabrous in *F. B. I.*) longitudinally ribbed; coma 1·5 in. long.

GOALPARA, SYLHET.

Flrs. 5. Fr. 11-1.

2. Gymnema lactiferum *Br.*

A climbing shrub; branches pubescent. *Leaves* 2·5-3 by ·75-1 in., ovate-oblong, elliptic or elliptic-lanceolate, acuminate, entire, subcoriaceous; glabrous; lateral nerves 3-4 on either half; base attenuate; petiole slender, ·3-·75 in. long. *Cymes*

axillary, pubescent; peduncles ·25 in. *Flowers* ·16 in. across. *Calyx* puberulous; segments round, ciliate. *Corolla* tube exceeding the calyx lobes, ovate, puberulous. *The* ridges of the corona more or less protruding from the mouth of the corolla. *Style* exceeding the stamens.

KHASI HILLS (Brandis—409).

Flrs. 5.

3. Gymnema latifolium *Wall.*

A twining shrub, pubescent. *Leaves* 2-5 by 1·5-2·5 in., suborbicular, usually acute, chartaceous, pubescent on the midrib above and nerves beneath; lateral nerves 5-7 on either half, prominent beneath; base rounded; petiole ·5-·8 in. long, pubescent. *Flowers* in many flowered pedunculate binate umbellate cymes; peduncles stout, ·3-·6 in. long; pedicels pubescent. *Calyx* segments pubescent, ovate-obtuse. *Corolla* lobes ciliolate. *Follicles* about 3 in. long, punctate.

SIBSAGAR.

Flrs. 9. Fr. 12.

4. Gymnema tingens (Roxb.) *Spr.*=G. tingens W. & A.

A large twining shrub. *Bark* corky, furrowed on old stem; branchlets glabrescent. *Leaves* 2·5-6 by 1·5-3·5 in., elliptic-oblong or ovate, usually abruptly acuminate or caudate, membranous, glabrous when mature; lateral nerves 5-7 on either half; base usually with a tuft of glands at the junction with the petiole, cordate to truncate; petiole ·6-2 in. long. *Flowers* pale yellow or cream-coloured, ·3-·4 in. across in lax pubescent corymbiform racemose cymes; peduncles ·5-·9 in. long; pedicels filiform, ·5-·75 in. long. *Calyx* 5-partite, glandular within; segments pubescent outside. *Corolla* tube campanulate, pubescent within; lobes oblique. *Follicles* usually single, 4-6 by ·4-·5 in., smooth with pointed tips and narrowed base. *Seeds* about ·5 in. long, ovate, thin and margined; coma up to 2 in. long.

GOALPARA.

Flrs. 5. Fr. Cold season.

Pentasacme caudatum *Wall.*

A very slender tufted glabrous herb with rather woody stems. *Leaves* 2-3 by ·16-·6 in., linear-lanceolate, caudate-acuminate, thin, bright green; nerves obscure. *Flowers* ·5 in. long, yellowish in axillary umbelliform cymes; pedicels filiform. *Calyx* 5-partite; segments subulate. *Corolla* tube short; lobes triangular, suddenly terminating in long filiform tails. *Corona* 4-fid. *Anther* tips membranous. Stigma included, obtuse. *Follicles* slender, terete, 2·5-3 in. long. *Seeds* ·1 in. long, reddish-brown, ovate.
KHASI HILLS, Patkoi Hills (U. Assam) upto 3,000 ft. (*F. B. I. IV.* 28).

Flrs. & Fr. 6-7.

P. Wallichii *Wight.*

Stouter stem. *Leaves* elliptic-lanceolate. *Flowers* much larger than above species with broader corolla lobes. *Stigma* beaked.
SYLHET, Mishmi Hills upto 3,500 ft. (*F. B. I. IV.* 28).

Flrs. 5-7. Fr. 8-10.

15. MARSDENIA Br.

Twinning shrubs or undershrubs, rarely erect. *Flowers* in simple or branched umbelliform cymes. *Calyx* 5-partite. *Corolla* campanulate, urceolate or salver-shaped; lobes spreading, narrow or broad, overlapping to the right. *Corona* processes membranous, hard or fleshy, adnate at the base to the staminal column, the apical portion free. *Staminal* column arising from or near to the base of the corolla; anthers with membranous tips; pollinia erect waxy, shortly pedicelled. *Style* apex flat, convex or depressed, beaked, sometimes elongated. *Follicles* 2 (more usually by abortion) lanceolate or poniard-shaped. *Seeds* comose.

Coronal scales usually longer:—
Corolla large, ·25 in. long or more :—
Style-table short:—
Branches, petioles and leaves beneath tomentose:—
Cymes corymbose. Leaves 4-6 in. .. 1. *M. tenacissima.*
Branches, petioles and leaves glabrous or puberulous:—
Cymes subumbellate. Leaves 7-10 in. 2. *M. Jenkinsii.*
Style longer than the staminal column; apex bifid. Glabrous except the inflorescence. Flowers greenish yellow. .. 3. *M. Griffithii.*

Corolla small, less than ·25 in. long :—	
Follicles narrowed at the base, slightly puberulous. Seeds narrowly ovoid. ..	4. *M. tinctoria.*
Follicles broad at the base with long spreading hairs. Seeds broadly ovate.	5. *M. eriocarpa.*
Coronal scales very short, spurred. Stigma fusiform. A powerful climber.	6. *M. thyrsiflora.*

1. Marsdenia tenacissima *Wight & Arn.* Vern. *Sunamarai,* Nep.

A large twining shrub; extremities, undersurface of leaves and inflorescence softly tomentose. *Leaves* 3-6 by 2-4 in., broadly ovate or orbicular, acuminate, subcoriaceous, velvety; basal nerves 5-7; base cordate; lobes rounded; petiole ·5-·3 in. long. *Flowers* about ·25 in. across, greenish yellow, in much branched corymbose cymes; peduncles intra-petiolar. *Calyx* segments pubescent, ovate-oblong, obtuse. *Corolla* pubescent outside, glabrous within; lobes reflexed with incurved margins. *Follicles* usually solitary, 4-6 by 1-1·4 in., longitudinally wrinkled, tip often recurved. *Seeds* broadly ovate, brown, margined, ·6 by ·3 in.; coma up to 2·5 in. long.

SYLHET, GOALPARA, NOWGONG.

The fibres are strong and are used for fishing lines, etc.

Flrs. 4-7. Fr. Cold season.

2. Marsdenia Jenkinsii *Hook. f.*

A glabrous or puberulous twining shrub; branches very stout. *Leaves* 7-10 by 5-7 in., broadly elliptic or orbicular, cuspidate, coriaceous, almost glabrous, pale beneath; lateral nerves 6-8 on either half, conspicuous; petiole 2-3 in. long. *Flowers* in sub-umbellate cymes. *Sepals* ·5 in. long, lanceolate, pubescent. *Corolla* ·75 in. across; tube globose; lobes villous within, glabrous without; coronal scales subulate or acute, much longer than the staminal column. *Style* table short, conical. *Fruit* not seen.

(ASSAM, *Jenkins* (Herb. Royal Botanic Garden, Sibpur).

3. Marsdenia Griffithii *Hook. f.*

A glabrous twinner. *Leaves* 3-7 by 1·5-3·5 in., elliptic, bluntly acuminate, coriaceous, glabrous, pale beneath; lateral

nerves slightly arched; base cordate or rounded; petiole 1-1·5 in. long. *Flowers* greenish-yellow in slightly purpureous, shortly penduncled corymbiform cymes. *Sepals* ciliate, half the length of the corolla. *Corolla* lobes slightly hairy within, glabrous without; coronal scales shorter than the orbicular anther tip. *Style* larger than the staminal column; apex bifid. *Fruit* not seen.

KHASI HILLS (upto 6,000 ft.) Myran, *Griffith, H. f. & T.*

4. Marsdenia tinctoria *Br.* Vern. *Mei-ni-buli-likur,* Khasi; *Man-ri,* Miri.

A stout tall climber, almost glabrous, extremities pubescent. *Leaves* 2-8 by ·8-3 in.; ovate-acuminate, membranous (bluish when dry), finely pubescent when young, glabrous when mature; main nerves 7-8 on either half; midrib pubescent with a strong gland near the junction of the petiole; base more or less cordate; petiole ·5-1·75 in. long. *Flowers* small in axillary densely flowered thyrsoid panicle. *Calyx-segments* ovate, pubescent externally. *Corolla* constricted at mouth. *Corona* process membranous, subulate, longer than the anthers. *Style* apex umbonate. *Follicle* 1, 3 by ·5 in., narrow and tapering, tomentose; base oblique. *Seeds* ·5 by ·2 in.; coma 1·25 in. long.

GOALPARA, SIBSAGAR, LAKHIMPUR, KHASI & JAINTIA HILLS, N. E. FRONTIER TRACT.

Flrs. 9. Fr. 3.

5. Marsdenia eriocarpa *Hook. f.*

A tall climber, similar to Marsdenia tinctoria *Br. Corolla* much less than ·25 in. long. *Follicles* shorter, broader at the base and turgid, villous with long spreading hairs; seeds broadly ovate.

SYLHET-*Wallich.* ASSAM-*Masters.*

6. Marsdenia thyrsiflora *Hook. f.*

A strong climber, almost glabrous. *Leaves* 4-8 by 2-6 in., broadly ovate or oblong, acuminate, membranous; base cordate; petiole 1-3 in. long. *Flowers* small in cymose

clusters arranged in racemes; rachis flexuous; pedicels very short. *Sepals* obtuse, almost glabrous. *Corolla* greenish or yellow, glabrous, ·1-·15 in. long; lobes coriaceous, erect; coronal scales very short like spurs at the base of anther. *Stigma* fusiform. *Follicles* 2 in. long, coriaceous; base turgid; seeds ovate.

ASSAM—*Masters.*

Flrs. & Fr. 6-9.

16. TELOSMA Coville. (Pergularia F.B.I.)

Telosma pallida (*Roxb.*) *Craib*=Pergularia pallida W. & A.

A large twining shrub. *Bark* corky when mature. *Leaves* 1·5-4 by ·8-3·2 in., ovate-acuminate or acute, membranous, glabrescent or somewhat pubescent specially on the nerves beneath; lateral nerves 4-6 on either half; midrib glandular above at the base, cordate or sub-cordate; petiole ·5-1·5 in. long. *Flowers* yellowish, ·7-1·3 in. across on dense umbellate cymes. *Calyx* pubescent, deeply cleft; segments broadly subulate, ciliate. *Corolla* salver-shaped, deeply lobed, tube swollen; lobes linear-oblong, obtuse, overlapping to the right in bud. *Coronal* processes (staminal) arising from the base of the staminal column, flattened, each with a lamella from the inner face, which exceeds the stigma; style apex capitate. *Follicles* usually solitary, 2·5-4 by ·7-1 in., bluntly beaked, smooth with a thin shell. *Seeds* ·4 in., margined, comose.

KHASI HILLS.

Flrs. 6-8. Fr. Cold season.

17. GONGRONEMA Dcne.

Gongronema nepalense *Dcne.*

A large twining shrub with thick milky juice; young shoots and inflorescence pubescent. *Leaves* 3-6 by 1·5-4 in., oblong, elliptic or ovate-acuminate, subcoriaceous, in maturity glabrous above, puberulous along the nerves beneath; lateral nerves about 7-9 on either half; base rounded or subcordate; petiole ·5-2 in. long. *Flowers* yellowish, ·25 in. across in axillary umbellate cymes branching into 3 divaricate arms;

peduncles 2-6 in. long, slender. *Calyx* 3-partite. *Corolla* campanulate, slightly overlapping to the right. *Coronal* scales usually absent. *Anther* tips inflexed, concealing the stigma; pollinia 1 in each cell, erect, waxy. *Stigma* clavate or conical. *Follicles* 2·5-3 by ·2-·3 in. *Seeds* ·3 in. long; coma fine silky white, about 1·2 in. long.

GOALPARA, SIBSAGAR, K. & J. HILLS (4,800 ft.).

Flrs. 8-9. Fr. Cold season.

Gongronema ventricosum *Hook. f.*

A glabrous twiner. *Leaves* 3 by 1-1·25 in., ovate or ovate-lanceolate, obtusely acuminate, coriaceous; lateral nerves 2-3 on either half, prominent beneath, arching within the margin; petioles stout, ·25-·3 in. long. *Flowers* in subsessile few-flowered cymes; pedicels short. *Calyx-segments* very small. *Corolla* ·3 in. long; tube glabrous within, lobes linear with recurved margins. *Coronal* scale recurved.

KHASI HILLS. (*F. B. I.* IV. 34).

18. DREGEA E. Meyer.

Wattakaka volubilis (*L. f.*) *Stapf.* in. Bot. Mag. Subtab 8976.-Dregea volubilis Benth. Vern. *Khamal-lota,* Ass.; *Soh-tyllai,* Khasi.

An extensive twining woody shrub; young parts tomentose; branches often postular. *Leaves* 2-5 by 1-3·3 in., ovate, acute or acuminate, subcoriaceous, softly pubescent with curled hairs, when young, becoming smoother with age; main lateral nerves 3-5 on either half, lower basal; base cuneate, rounded, truncate or less often cordate with a tuft of bristles at the junction with the petiole; petiole ·5-2 in. long. *Flowers* greenish, ·3-·5 in. across, in axillary or interpetiolar pubescent drooping umbellate cymes; peduncles slender, 1-3 in. long; pedicels ·5-1·5 in. long. *Calyx* about ·1 in. across, 5-partite; segments ovate-obtuse. *Corolla* green, cup-shaped, ultimately spreading; lobes ovate, obtuse, ciliate. *Corona* (staminal) processes, fleshy, glabrous with a short beak from the inner margin, bent towards stigma. *Pollinia* erect, waxy. *Style* apex dome-shaped. *Follicles* usually double, 3-4 by 1-1·2 in., velvety when young, divaricate, apex somewhat

blunt. *Seeds* 3-4, broad-ovate, margined; coma about 1·5 in. long.

KAMRUP.

Flrs. 4-6. Fr. Cold season.

19. TYLOPHORA Br.

Twining, rarely erect perennial herbs or undershrubs. *Flowers* small, often minute in simple or branched racemose, umbelliform or fascicled cymes. *Calyx* 5-partite, glandular with segments ovate or lanceolate. *Corolla* rotate or rotate-campanulate, deeply 1-lobed; lobes slightly overlapping to the right. *Staminal* corona processes adnate wholly or in part to the very short staminal column; anthers small with an inflexed membranous tip; pollinia 1 in each cell, erect or ascending, rarely transverse or pendulous from the stalk. *Style-apex* disciform, 5-gonal or 2-lobed. *Follicles* 2 (or by abortion 1), smooth, acuminate. *Seeds* flattened, margined; coma silky; cotyledons elliptic; radicle cylindric.

Branches and inflorescence glabrous.	
Coronal processes globose without free points above. Calyx glabrous:—	
Leaves 2-6 in. long.	1. *T. longifolia.*
Leaves under 2 in. long.	2. *T. tenuissima.*
Branches and inflorescence more or less pubescent:—	
Coronal proresses without free tips above. Calyx pubescent:—	
Leaves glabrous.	3. *T. exilis.*
Leaves tomentose.	4. *T. hirsuta.*
Coronal processes with free points. Leaves pubescent or tomentose; free points quite glabrous.	5. *T. himalaica.*

1. Tylophora longifolia *Wight.*

A slender twiner. *Leaves* 2-6 by ·8-2 in., lanceolate, ovate-lanceolate or oblong-lanceolate, acuminate, membranous, glabrous; base acute, rounded or subcordate with a tuft of glands above at junction of the petiole; petiole slender, ·4-·8 in. long, channelled above. *Flowers* greenish in paniculate umbelliform cymes; pedicels filiform. *Calyx* glabrous. *Corolla* lobes 5-7-nerved. *Anthers* broad with short incurved appen-

dages. *Follicles* 2, divaricate at an angle of 90° up to 5 in. long, winged. *Seeds* oblong, truncate, crowned with a silky coma.

KHASI HILLS.

Flrs. 5. Fr. Cold season.

2. Tylophora tenuissima *Roxb. Wt. et Arn.* T. tenuis Blume.

A slender twiner, nodes of branches sparsely pubescent. *Leaves* variable, ·6-1·9 by ·3-·6 in., elliptic-ovate or oblong-lanceolate, acute or acuminate, glabrous; lateral nerves obscure; base acute or obtuse; petiole ·1-·3 in. long. *Flowers* dark red in lateral panicled glabrous cymes; pedicels slender. *Bracts* lanceolate, subulate. *Calyx* glabrous; segments ·04 in. long, acute, lanceolate. *Corolla* ·16 in. across; lobes ·06 in., ovate-oblong, glabrous, veined. *Corona* of 5 dark coloured; tubes adnate to the staminal column. *Follicles* yellowish-green, 2-3 in., apiculate, minutely striate; coma up to ·9 in. long.

LAKHIMPUR (U. Kanjilal's No. 3278).

Flrs. 10. Fr. 6.

3. Tylophora exilis *Coleb.*

A slender twiner; branches puberulous at the nodes. *Leaves* 1·5-3·5 by 1-2 in., ovate-lanceolate or ovate-oblong, shortly acuminate, subcoriaceous, glabrous on both surfaces; lateral nerves 4-6 on either half with a tuft of minute glands at the junction of the petiole; base truncate, rounded or very shallowly cordate; petiole slender, ·4-·8 in. long. *Flowers* very small in flexuous simple or branched umbellate cymes; pedicels slender. *Calyx* pubescent externally; segments ovate-acute. *Anther* appendages membranous; pollinia ovoid. *Style-apex* pentagonal, flat. *Follicles* 2·5-3·5 by ·25 in., acuminate. *Seeds* ·3 by ·1 in., ovate, apex truncate; coma about 1 in. long.

SIBSAGAR, SYLHET, KHASI and JAINTIA HILLS (5,000 ft.)

Flrs. 9. Fr. 12.

4. Tylophora hirsuta *Wall.*

A rather stout twining shrub; stem densely clothed with soft spreading hairs. *Leaves* 1·3·5 by ·5-1·5 in., ovate or ovate-lanceolate, acute or acuminate, subcoriaceous, pubescent on both sides, specially hairy on the nerves; lateral nerves 4-5 on either half; base rounded, acute or sub-cordate; petiole ·5-1 in. long, tomentose. *Flowers* greenish, ·2-·3 in. across, in few fld. villous umbellate cymes. *Calyx-segments* pubescent, lanceolate. *Corolla* about ·2 in. across, puberulous within. *Pollinia* horizontal. *Follicles* 2-2·5 by ·2-·3 in., smooth. *Seeds* ·25 in. long, compressed, truncate; coma about 1 in. long.

CACHAR, KHASI HILLS (5,000 ft.).

Flrs. 5. Fr. Cold season.

5. Tylophora himalaica *Hook. f.* Vern. *Par-kol*, Ass.

A slender twiner, glabrous. *Leaves* 1·5-3·5 by ·5-1·5 in., ovate, lanceolate or elliptic-oblong, acuminate, membranous, glabrous; lateral nerves 5-7 on either half; base rounded or obtuse; petiole ·3-·7 in. long. Flowers in panicled umbellate cymes, often 2 or more from the same axil. *Calyx segments* lanceolate. *Coronal* processes gibbous. *Follicles* 2, about 4-4·5 in., narrowly poniard-shaped. *Seeds* ·3 in. long, ovate; coma 1·75 in. long.

SIBSAGAR, KHASI HILLS.

Flrs. Rainy season. Fr. 11.

T. rotundifolia *Ham.*

A carious plant, herbaceous; stem pubescent, trailing flat along the ground; root-stock woody. *Leaves* 2-3·5 in. across, elliptic orbicular or broadly ovate, rounded or slightly acute, sometimes emarginate at apex, coriaceous, more or less pubescent; base rounded or cordate; petiole ·16-·25 in. long. *Flowers* in many flowered sessile umbellate cymes; pedicels long, filiform. *Calyx-segments* lanceolate, hirsute. *Corolla* ·25-·5 in. across; lobes ovate. *Coronal* process sub-globose (not pointed at apex). *Follicle* broadly fusiform, hard, about 2 in. long; seeds almost orbicular; coma caducous, 8 in. long.

ASSAM (Dangtota & Habra Ghat). (*F. B. I.* IV., 43).

Flrs. 5-7. Fr. 11-12.

T. asthmatica *W. & A.* Vern. *Ananthamul, Antomul,* Beng.

A much branching climber, usually pubescent, slender; roots fleshy. *Leaves* variable, 2-4 by 2 in., elliptic-oblong or ovate, apiculate, rather thickly coriaceous; nerves few, spreading; base rounded sometimes, petiole ·3-·1 in. long. *Flowers* ·6 in. across, dull, yellow-purple near the base in umbellate or racemose pedunculate, hairy cymes. *Calyx-segments* hispid. *Corolla* ·3 in. across. *Coronal* processes forming a closed ring with large round free lobes at base; the apex with a finely acuminate point. *Follicle* lanceolate, sharp pointed, 2-4 in. long; seeds ovate.

ASSAM, CACHAR. (*F. B. I.* IV., 44).

The roots and leaves are used as a substitute for Ipecacuanha.

Flrs. 5-6. Fr. 8-9.

T. Belostemma *Benth.*

A softly hirsute twiner; hairs reflexed on stem. *Leaves* 1·5-2 in. long, ovate-cordate, acuminate, pale-green when dry, hirsute on both sides; petiole ·5-·6 in. long. *Flowers* in few flowered umbelliform sub-sessile cymes; peduncles shorter than petioles. *Calyx-segments* lanceolate, hirsute. *Corolla* ·25 in. across, purplish; lobes ovate, pubescent within. *Staminal column* contracted below the anthers. *Coronal* processes linear, radiating from the base of the column.

KHASI HILLS (Cherrapunjee and below), 2-4,000 ft. (*F. B. I.* IV., 43).

Flrs. 5-8.

20. TREUTLERA Hook. f.

Treutlera insignis *Hook. f.* Vern. *Meiktah,* Khasi.

A stout glabrous climbing shrub; stem strongly tubercled with milky sap, fibrous, silky white. *Leaves* 3-5·5 by 1·3-2·5 in., ovate-lanceolate, elliptic, elliptic-lanceolate, acuminate, coriaceous, glabrous; lateral nerves 4-6 on either half; base rounded or obtuse; petiole stout, ·6-2 in. long. *Flowers* large in axillary simple, pedunculate umbels, sometimes one umbel above another; peduncles 1-1·5 in. long; pedicels ·5-1 in. long. *Calyx* glandular within; segments ciliate. *Corolla* coriaceous, purplish, rotate, glabrous, 1-1·5 in. across; lobes ciliolate, overlapping to the right. *Coronal* processes fleshy, connate to the back of the anthers. *Anthers* inflexed, rounded; pollinia solitary, waxy, erect, stalked. *Style-apex* hemispheric.

KHASI HILLS (U. Kanjilal's No. 5930).

Flrs. 8-9.

Cosmostigma racemosum *Wight.*

A stout climbing glabrous shrub. *Leaves* deciduous 3-4·5 by 1·5-3 in., rounded or ovate, acuminate, rather coriaceous; base sometimes cordately 2-lobed; petiole 1-2 in. long. *Flowers* greenish with brown dots, in axillary or lateral racemose cymes. *Calyx* 5-partite; segments ciliate; glands in pairs between the lobes. *Corolla* ·3 in. across, 5-fid, rotate; lobes slightly overlapping to the right. *Coronal* processes erect, membranous, adnate to the base of the staminal column. *Ovary* 2-carpelled; style thick. *Follicle* large, lanceolate, smooth, 7 by 1·5 in. in diameter; seeds ·6 in. long, ovate, margined, ending in a silky coma.

SYLHET. (*F. B. I.* IV., 46).

Flrs. 5-7.

21. DISCHIDIA Br.

Herbs or undershrubs, usually epiphytic, climbing and rooting on trees or pendulous from them, sometimes almost leafless. *Leaves* usually fleshy, sometimes converted into pitchers. *Flowers* very small or minute in axillary racemose or umbellate cymes or fascicles. *Calyx* small, 5-partite, membranous, glandular within scales. *Corolla* urceolate or campanulate, tubular; lobes 5, valvate. *Corona* (staminal) of 5 membranous processes adnate to the back of the staminal column, erect, tips entire, notched or 2-fid or with recurved arms. *Staminal* column very short; anther tips membranous; pollinia solitary in each cell, waxy. *Ovary* of 2 carpels; style apex flat or conical. *Fruit* of 2 small thick or slender, smooth, acuminate follicles. *Seeds* small; coma long.

Leaves partly or wholly converted into pitchers :—	
Ordinary leaves ·5-1 in. diameter; pitcher leaves 1·5-4 in. long.	1. *D. Raffesiana.*
Leaves normal :—	
Leaves ·3-·5 by ·2-·3 in.; petiole 0-·05 in. long.	2. *D. Nummularia.*
Leaves ·5-1·8 by ·2-·4 in.; petiole 0-·05 in. long.	3. *D. benghalensis.*
Leaves quite orbicular; petiole ·12-·25 in. long.	4. *D. khasiana.*

1. Dischidia Raffesiana *Wall.* Vern. *Hankha-ojhar-mona,* Ass.; *Bandikuá,* Garo.

A creeping epiphytic undershrub with milky-juice rooting on the trunk and branches of trees and often pendulous

from their stem, almost glabrous. *Roots* incased in pouch-like cases. *Leaves* (ordinary) ·5-1 in. in diam., orbicular; *Leaves* (modified pitchers) 1·5-4 by ·8-1·5 in., oblong, ovate-oblong, fleshy, thick. *Flowers* yellowish. *Corolla* fleshy, urceolate. *Follicles* divaricate at an angle of 180°, 3 by ·2 in. *Seeds* somewhat angled, about ·1 in. long, winged; coma 1-1·5 in. long.

KAMRUP, NOWGONG, GARO HILLS.

The ants which live in the pitchers reciprocate by bringing fine earth to the rootlets which remain hidden inside the pitchers.

The rootlets are used as a medicine by Assamese Ojhas.

Fr. 4.

2. Dischidia Nummularia *Br.* Vern. *Thukura-khumal,* Kamp.

A slender epiphytic herb. *Leaves* ·3-·5 by ·2-·3 in., orbicular, convex on the upper surface, fleshy, coriaceous; petiole 0-·05 in. long. *Flowers* whitish in 2-3 flowered clusters. *Lobes* of corona processes curved downwards, spathulate.

KAMRUP.

Flrs. 4. Fr. Cold season.

3. Dischidia benghalensis *Coleb.*

A fleshy epiphytic undershrub. *Leaves* ·5-1·8 by ·2-·4 in., fleshy, thick, narrow, oblong or spathulate; petiole 0-·05 in. long. *Flowers* whitish in axillary clusters. *Lobes* of corona processes horizontal or up-curved.

SIBSAGAR, GOALPARA, N. C. HILLS.

Flrs. 5. Fr. Cold season.

4. Dischidia khasiana *Hook. f.*

A slender epiphytic creeper, almost glabrous. *Leaves* quite orbicular; petiole ·12-·25 in. long.

KHASI HILLS.

22. HETEROSTEMMA W. & A.

Twining shrubs or undershrubs. *Leaves* usually with 3-5 basal nerves. *Flowers* small in lateral sessile or pedun-

culate umbellate or racemiform cymes; pedicels slender. *Calyx* 5-fid or partite. *Corolla* campanulate, urceolate or rotate; lobes veined, triangular, valvate. *Coronal* process of 5 lobes spreading more or less horizontally from the staminal column. *Staminal* column short, depressed; anthers minute; pollinia solitary in each cell, sessile, waxy, erect. *Style-apex* 5-angled, flat, not exserted beyond the anthers. *Follicles* slender, straight, terete; pericarp thin. *Seeds* winged, comose.

Branches hairy :—		
Coronal process orbicular.	1.	*H. Wallichii.*
Coronal process ovate-lanceolate, acuminate with a large appendage.	2.	*H. alatum.*
Branches obscurely pubescent. Coronal processes stellately 5-lobed without appendage. ..	3.	*H. stellatum.*

1. Heterostemma Wallichii *Wight.*

A twining shrub; branchlets hairy chiefly along 2 lines. *Leaves* 3·6·5 by 1·5-3 in., ovate-oblong or elliptic, acuminate, subcoriaceous, glabrous; lateral nerves 4 on either half, conspicuous; base rounded or sub-cordate; petiole ·5-1·8 in. long. *Flowers* greenish, ·3-·6 in. across in small cymes. *Coronal* processes orbicular. *Fruit* not seen.

ASSAM, NAGA HILLS, KHASI HILLS.
Flrs. 5-6.

2. Heterostemma alatum *Wight.*

A twining shrub; branches with two lines of hairs. *Leaves* 2·5·5 by ·8·3 in., ovate-elliptic, ovate or ovate-lanceolate, acuminate, subcoriaceous, glabrous; nerves winged beneath; rounded or acute; petiole ·5-2 in. *Flowers* yellowish; pedicels ·6-·75 in. long. *Follicles* linear, 3·5-4·5 by ·2-·25 in., divaricate at an angle of 175°-190°. *Seeds* ovate, ·6 by ·2 in., margined; coma about 2 in. long.

KHASI HILLS.
Flrs. Fr. 1.

3. Heterostemma stellatum *Hook. f.*

A twining shrub; branches rather pubescent. *Leaves* lanceolate or elliptic-lanceolate, acuminate; nerves beneath

winged with a conspicuous intramarginal nerve. *Coronal* process stellately 5-lobed, triangular-acute, without appendage.

(No specimen, *F.B.I.*, p. 47, Vol. IV).

23. HOYA Br.

Twining pendulous or rambling and rooting shrubs, sometimes epiphytic, rarely erect. *Leaves* usually thick and fleshy or coriaceous. *Flowers* in axillary, terminal or lateral umbelliform cymes. *Calyx* small, 5-partite with 5 glandular scales. *Corolla* rotate, fleshy or waxy; lobes 5, often convex or spreading or reflexed, valvate in bud. *Corona* of 5 fleshy membranous or horny processes adnate to the staminal column, stellately spreading or ascending, often concave on the upper surface; margins usually recurved so as to enclose a hollow space, the inner angle often produced into a tooth or spur, which is erect or incumbent on the anther. *Staminal* column short; anthers conniving over the stigma with a membranous appendage; pollinia erect waxy, solitary in each cell, pedicelled. *Ovary* of 2 distinct carpels; style-apex 5-angled, tip flattened or slightly apiculate. *Follicles* 1 or 2, usually slender, variable. *Seeds* small, ovate or oblong; coma long; cotyledons thick; radicle cylindric.

Hoya (after J. D. Hooker).

Corolla reflexed; lobes larger than broad:—
  Collum stalked:—
    Coronal process very long, erect with a long spur diverging from base of each:—
      Umbels many flowered. .. .. 1. *H. multiflora.*
  Collum sessile:—
    Coronal process laterally compressed, semi-cordate, 2-winged:—
      Umbels few flowered. .. .. 2. *H. acuminata.*
Corolla lobes spreading or recurved, broader than long:—
  Collum sessile or sub-sessile:—
    Coronal process stellately spreading; inner angle acute or produce into an erect or recurved spur:—
      Inflorescence terminal or terminal and axillary:—
        Leaves flat:—

Umbels pedunculate:—
Sepals oblong-lanceolate, pubescent. .. 3. *H. lanceolata.*
Umbels sub-sessile:—
Sepals ovate-lanceolate, glabrous. .. 4. *H. Lobbii.*
Inflorescence axillary umbels:—
Corolla ·5 in. across or more; lobes spreading or incurved:—
Leaves very small:—
Leaves orbicular, ·75 in. in diameter 5. *H. Nummularia.*
Leaves elliptic, ·5 in. long. .. 6. *H. vaccinioides.*
Leaves very narrow; nerves almost obscure:—
Leaves narrowly oblanceolate, 4-8 in. long. .. .. 7. *H. longifolia.*
Corolla ·5 in. across. .. .. 8. *H. oblanceolata.*
Leaves broad, strongly 3-5 in. nerved:—
Leaves ovate-elliptic 3-5 in. long:—
Corolla ·3 in. across. .. .. 9. *H. parasitica.*
Leaves elliptic or linear-oblong, penni-nerved:—
Nerves very horizontal:—
Leaves linear-oblong 6-9 in. long:—
Corolla brown, ·3 in. across. .. 10. *H. fusca.*
Nerves sometimes oblique:—
Leaves narrow, oblanceolate, 6-9 in. long:—
Corolla purple, 1·5 in. across. .. 11. *H. Griffithii.*
Leaves orbicular, ovate-oblong or broadly elliptic, penninerved; nerves arching:—
Leaves variable, 3-8 in. long:—
Corolla cream-coloured, ·75 in. across; lobes spreading .. .. 12. *H. Arnottiana.*
Leaves elliptic or oblong ·5-7 in. long:—
Corolla cream-coloured ·6 in. across; lobes incurved. .. .. .. 13. *H. globulosa.*
Leaves ovate-oblong or oblong, 2-3 in. long.
Corolla ·5 in. across; lobes with fringed margin. .. .. 14. *H. Thomsoni.*

1. Hoya multiflora *Blume.*

An erect shrub, epiphytic. *Leaves* 4-9 by ·9-2·5 in. oblong, oblanceolate, entire, acuminate, coriaceous, glabrous; lateral nerves 7-9 on either half, slender, arching; base cuneate; petiole ·5-·8 in. long. *Flowers* in many flowered terminal or axillary umbellate cymes; peduncles 1·25-2 in.

long; pedicels slender, 1·8 in. long. *Calyx* segments, small, oblong. *Corolla* tube short; lobes triangular, ·5 in. long, deflexed, orange-coloured. *Corona* processes hairy. *Staminal* column stipitate. *Follicle* 7-8 in. long, slender. *Seed* narrow, winged; coma about 2 in. long.

(No specimen in the Forest Herbarium, Shillong).
NAGA HILLS (11,833 Watt).
Flrs. 3. Fr. 11.

2. Hoya acuminata *Benth.* Vern. *Tiw-reng-synreh*, Khasi.

Leaves 2-4 by ·8-1·4 in., elliptic-lanceolate, oblong-lanceolate, acuminate, entire, coriaceous, glabrous; nerves obscure; petiole ·1-·3 in. long. *Flowers* in umbellate cymes few flowered; peduncles ·4-·6 in., stout; pedicels slender, 1-1·25 in. *Follicles* not seen.

KHASI HILLS (3,000 ft.).
Flrs. 5-7.

3. Hoya lanceolata *Wall.*

A weak sub-epiphytic shrub. *Branches* long, pendulous; branchlets pubescent. *Leaves* 1-2 in. long, lanceolate or rhomboid-lanceolate, acuminate, fleshy, glabrous or sparsely puberulous on the midrib; midrib very obscure; base acute; petiole ·05-·1 in. long, hairy. *Flowers* in terminal and extra-axillary umbellate cymes; peduncles and pedicels stout, puberulous. *Calyx-segments* oblong, lanceolate, pubescent. *Corolla* lobes sub-triangular, puberulous within. *Corona* processes stellately spreading, fleshy. *Follicles* 5-6 in. long, slender. *Seeds* ·08 in.; coma 1-8 in.

(*F.B.I.* Vol. IV. P. 54).
ASSAM (King), LUSHAI HILLS (Mrs. Parry).
Flrs. 3-6. Fr. 8-1.

4. Hoya Lobbii *Hook. f.*

An epiphytic (found on Carallia integerrima). *Leaves* 2·5-3·6 by 1-1·6 in., ovate, ovate-elliptic, entire, acuminate, fleshy coriaceous, glabrous; lateral nerves 5-7 on either half,

faint, slender, arching; base shallow caudate, almost sessile. *Flowers* in terminal or axillary umbellate sub-sessile cymes. *Calyx* glabrous; segments ovate, lanceolate. *Corolla* hairy within, ·5-·7 in. across; lobes subacute. *Coronal* processes ascending, thick, terete, obtuse and sub-acute, inner angle raised acute, as long as the anther tip (Hook). *Follicles* pendent, bluntly acuminate, about 6 by ·25 in.; coma 1·6 in. long, cream or pale brown.

N. CACHAR, GARO HILLS, NOWGONG, KHASI HILLS (1,500 ft.).

Flrs. 8. Fr. 2-3.

5. Hoya Nummularia *Dcne.*

Stem slender, creeping and rooting at the nodes. *Leaves* ·75 in. in diameter, orbicular, thinly fleshy, shining, glabrous, thinly reticulate; petiole slender, ·25 in. long. *Flowers* in long peduncled umbellate cymes; peduncles about 2 in. *Calyx* segments ovate-oblong. *Corolla* ·3 in. across, white pubescent (Griffith).

(No specimen in the Forest Herbarium, Shillong).
KHASI HILLS (Griffith).

6. Hoya vaccinioides *Hook. f.*

Quite glabrous. *Leaves* ·5 in., elliptic, sub-acute, fleshy; nerves obscure. *Follicles* 3 in. long, slender, straight; pericarp thick.

UPPER ASSAM, Mishmi Hills (Griffith).

7. Hoya longifolia *Wall.*

A stout shrub with creeping and pendulous slender stem. *Branchlets* glabrous or sparsely pubescent. *Leaves* 2-6 by ·5-1·5 in., narrowly lanceolate or oblanceolate or elliptic-acuminate, very fleshy, dull green, glabrous; nerves very obscure; petiole stout, ·25-·8 in. long. *Flowers* ·6-·7 in. across, slightly fragrant in umbellate cymes; peduncles up to 2 in. long, stout, glabrous. *Calyx-segments* ovate-acute, glabrous. *Corolla* lobes subtriangular, as broad as long, glabrous,

margins ciliate. *Coronal* process stellate, spreading, shining. *Follicles* 6-12 in. long. *Seeds* minute; coma about ·5 in.

KHASI HILLS (5,000 ft. G. Mann).

Flrs. 6-8. Fr. 2.

8. Hoya oblanceolata *Hk. f.*

Stout climbing shrub. *Leaves* 4-6 in., narrowly oblanceolate-acuminate, entire, very fleshy. *Peduncle* ·25-1 in. thick; pedicels slender, glabrous. *Calyx* segments ovate-acute. *Corolla* ·5 in. across, pale, puberulous within. *Coronal* processes sub-erect.

No specimen in the Forest Herbarium, Shillong.

KHASI HILLS (4,000 ft.).

9. Hoya parasitica *Wall.*

An epiphytic creeping shrub (on Vatica lanceæfolia). *Branches* stout, glabrous, twining. *Leaves* 2-6 by ·9-2·5 in., oblong-elliptic, ovate-elliptic or lanceolate, acute or acuminate, fleshy, glabrous, obscurely indistinctly nerved at the base; base rounded or obtuse; petiole thick, ·2 in. long. *Flowers* waxy, white, faintly scented with a pink or purplish centre in densely umbellate cymes; peduncles stout, 1-3 in. long; pedicels slender, glabrous, ·5-·8 in. long. *Calyx* oblong-obtuse. *Corolla* ·3 in. across; lobes inflexed, glabrous, ovate-acute. *Corona* pinkish brown; lobes long, lanceolate-acute. *Follicles* 3-5 by ·15 in., finely striate, glabrous. *Seed* minute, ovate; coma 1·2 in. long.

SIBSAGAR, GOALPARA, KAMRUP, GARO HILLS, KHASI HILLS (2,000 ft.).

Flrs. 3-4. Fr. 6-7.

10. Hoya fusca *Wall.*

An epiphytic fleshy creeping shrub. *Leaves* 6-9 by 1·2-2 in., oblong or elliptic-oblong, entire, acuminate, fleshy, glabrous, epidermis of lower surface quite plain and can be peeled off when the veins are quite conspicuously visible and horizontal; base obtuse; petiole stout, ·5-·9 in. long. *Flowers* usually in axillary umbellate many flowered cymes; peduncles about 1 in. long; pedicels as long or slightly longer.

Calyx segments ovate, sub-acute, glabrous. *Corolla* about ·5 in. across, pubescent within, lobes broadly ovate-acute. *Coronal* process short, very thick, obtuse, concave above, inner angle ending in an erect or recurved spur. *Follicle* straight, divaricate through an angle of 135°, 4-5 by ·3 in., terete, tapering to the obtuse point, sometimes single. *Seeds* compound, ovate-acute, coma 1·9 in. long.

KHASI HILLS (5,200 ft.).

Flrs. 7. Fr. 12.

11. Hoya Griffithii *Hook. f.*

A large climbing shrub. *Leaves* 3·5-6 by ·75-1·3 in., oblong or oblanceolate or elliptic-lanceolate, acuminate, coriaceous, glabrous, bright green above, pale beneath; nerves rather obtuse, nearly horizontal; base acute; petiole ·5-1 in. long, stout; peduncles 2-4 in.; pedicels 1-1·5 in., very stout. *Calyx* segments green, spreading, ·5 in. long, broad, oblong, obtuse, concave. *Corolla* about 1·5 in. across, pale purplish without, cream but with reddish tints inside; lobes broad, ovate-acute. *Corona* waxy white, processes elliptic with ascending subulate apices, the sides are perpendicular with the upper edge overlapping at the back and beneath at the base, with a V-shaped notch.

NOWGONG, KHASI HILLS (2,000 ft.).

Flrs. 7.

12. Hoya Arnottiana *Wight.*

A tall climbing shrub, quite glabrous. *Leaves* variable, 3-8 by 2-4 in., elliptic or lanceolate, acute or acuminate, coriaceous, glabrous; nerves conspicuous; petiole ·5-1 in. long. *Peduncles* stout; pedicels about 1 in. *Calyx* segments broadly ovate-obtuse. *Corolla* glabrous within, ·75 in. across, lobes spreading, sub-acute. *Coronal* processes large, exceeding the tube. *Follicle* 4-5 in.

No specimen in the Forest Herbarium, Shillong.
UPPER ASSAM, Sadiya (Griffith).

Flrs. 7. Fr. 3.

13. Hoya globulosa *Hook. f.*

A stout climber; stem woody. *Leaves* 5-7 by 2-3·5 in., elliptic or oblong, cuspidate or acuminate, coriaceous, hairy, midrib stout, nerves conspicuous and arching; base rounded; petiole ·5-1 in. long. *Peduncle* 3-4 in.; pedicels villous, 1 in. *Calyx* segments rounded. *Corolla* ·5 in. across, cream-coloured, almost glabrous within; lobes short, incurved. *Coronal* processes short, broadly elliptic, pink, concave above, inner angle produced into an erect spur, which is shorter than the large broad anther tips. *Follicles* 12-16 in. long, very slender, cylindric; pericarp thin. *Seeds* ·3 in., slender.

LAKHIMPUR, CACHAR.

Flrs. 3-5.

H. teretifolia *Griff. Mss.*

A very singular plant, quite glabrous, slender, creeping and rooting. *Leaves* 5-7 in. long, slender, cylindric, quite terete.

UPPER ASSAM; Patkoi Hills, upto 4.000 ft. (*F. B. I.*, IV 54).

H. polyneura *Hook. f.*

A quite glabrous plant; branches stout, long, flexuous. *Leaves* variable, 3-4 by 1·2·5 in., ovate or lanceolate, acuminate, very fleshy; midrib slender; nerves very close; base narrow or rounded. *Flowers* in very shortly peduncled axillary umbels *Calyx* segments oblong-obtuse, glabrous. *Corolla* ·5 in. across, whitish; lobes papillose within. *Coronal* lobes red-purple, orbicular. *Follicles* 4 in. long, falcate, slender, smooth; seeds ovate-lanceolate.

Delai Valley (6,000 ft). (Kew. Bull. 1934). (*F.B.I.*, IV. 54).

Flrs. 8. Fr. 10.

14. Hoya Thomsoni *Hk. f.*

A slender shrub, stem rooting. *Leaves* 2-3 by ·6-1·5 in., oblong or ovate-oblong, acuminate, thinly coriaceous, sparsely pilose beneath; midrib and nerves obscure; base rounded or obtuse; petiole ·25-·5 in. long *Flowers* in short axillary umbellate cymes; peduncle ·5-1 in., pubescent; pedicels sparsely pubescent. *Calyx* segments ovate-acute, glabrous. *Corolla* ·5 in. across; lobe acute, margins ciliate. *Coronal* processes obovate with broad end outwards, concave

above with a boss, inner angle produced into a short erect spur.

KHASI HILLS 4,000 ft. (J.D.H. & T.T.) (*F.B.I.* p. 61, Vol. IV).

24. CEROPEGIA Linn.

Perennial herbs, erect or twining, usually with a tuberous rootstock. *Flowers* often large, variously coloured, in axillary pedunculate umbellate or racemose cymes, rarely in pairs. *Calyx* 5-partite, glandular within. *Corolla* tubular, elongate, more or less inflated at the base; lobes 5, valvate, more or less connate at their tips. *Corona* double, arising from the staminal column, the outer annular or cup-shaped, entire or 5-10-toothed or 5-fid; lobes more or less adnate to the inner of 5 short or long processes opposite to the anthers and incumbent on them or erect, column short. *Anthers* short, erect, without appendages; pollinia erect, 1 in each cell, sub-sessile with one pellucid margin. *Ovary* of 2 carpels; style apex truncate or shortly conical. *Follicles* usually slender, smooth, acuminate. *Seeds* comose.

Branches and peduncles hairy. Petiole ·25-·5 in. long. Corolla 1-2 in. or less, pale purple. ..	1.	*C. angustifolia.*
Branches sparsely hairy or glabrate. Petiole 1-2 in. long. Corolla 2-2·5 in., lobes yellowish with purplish tips.	2.	*C. pubescens.*
Branches glabrous. Petiole ·25-·5 in. long. Corolla about 2 in. long, tips slightly dilated ..	3.	*C. Arnottiana.*

1. Ceropegia angustifolia *Wight.*

An extensive slender twiner, pubescent or hairy. *Leaves* 2·5-7 by ·3-·5 in., narrow-lanceolate, finely acuminate, subcoriaceous, ciliolate, scabrid above, sparsely pubescent beneath; petiole ·2-·5 in. long. *Peduncles* pubescent, up to 2 in. *Corolla* tube purplish, lobe tips green. *Corona* of 10 lanceolate ciliate lobes. *Follicles* 1·25 in. long.

KHASI HILLS 4,000 ft.

Flrs. 7. Fr. Cold season.

2. Ceropegia pubescens *Wall.*

A slender twiner, sparsely hairy. *Leaves* 1·5-5 by ·5-2 in., ovate-acuminate, membranous, sparsely pubescent; base

ciliolate, rounded or cordate; petiole 1-2 in. long. *Peduncles* glabrous, 2-5 in. long. *Corona* of minute or obsolete lobes.

KHASI HILLS 4,000 ft.

Flrs. 8. Fr. Cold season.

3. Ceropegia Arnottiana *Wight.*

A slender almost glabrous creeper. *Leaves* 1·5-3 by ·3-1·3 in., oblong-lanceolate, long acuminate, chartaceous, ciliolate, puberulous above, glabrous beneath; base rounded or obtuse; petiole ·2-·7 in. long. *Peduncles* very short, very few flowered. *Corona* of 5 obtused bifid lobes.

KHASI HILLS 5,000 ft.

Flrs. 9. Fr. Cold season.

C. lucida *Wall.*

An extensive climber, quite glabrous. *Leaves* 4-7 by 1·5-3 in., ovate-lanceolate, membranous; petioles ·5-1·5 in. long. *Flowers* in short peduncled many flowered umbellate cymes. *Calyx* segments ·25-·3 in. long. *Corolla* 1·5-2 in. long, curved, green, spotted with purple; lobes linear with dilated and ciliate tips. *Coronal* processes linear-spathulate; lobes 10, short, triangular, ciliate.

KHASI HILLS (Tharia Ghat). CACHAR, SYLHET. (*F. B. I.*, IV. 73).

Flrs. 9-11.

FAM. 87. LOGANIACEÆ.

Trees, shrubs or herbs, sometimes climbing. *Leaves* opposite, simple, stipulate; stipules often very much reduced. *Flowers* small, white, usually regular, hermaphrodite, 4-5-merous, in terminal or axillary, simple or compound cymes, sub-capitate or panicled, rarely solitary; bracts and bracteoles present. *Calyx* inferior, small. *Corolla* lobes tubular, funnel-shaped or campanulate, imbricate or valvate or contorted. *Stamens* inserted on the corolla tube, alternate with the lobes; anthers 2-celled, introrse. *Ovary* free, 2-locular; style simple; stigma 2-fid or 2-partite; ovules 1 or more in each cell; placentas on the dissepiment or basal in the inner angle. *Fruit* a speticidal capsule or baccate, 1-many-seeded; albumen copious, fleshy or cartilaginous; embryo straight.

Ovary with many ovules in each cell:—		
Herbs; flowers 5-merous, corolla lobes valvate; capsule didymous; cymes 2-3-chotomous.	**1.**	**Mitreola.**
Trees or shrubs, often scandent:—		
Corolla lobes imbricate. Fruit capsular, 2-valved:—		
Style clavate.	**2.**	**Buddleia.**
Style 4-fid at apex.	**3.**	**Gelsemium.**
Corolla lobes valvate. Fruit baccate, indehiscent. Leaves tomentose, nerve reticulated.	**4.**	**Strychnos.**
Corolla lobes contorted. Fruit indehiscent. Leaves succulent.	**5.**	**Fagræa.**
Ovary with 1 ovule in each cell. Scandent shrub:—		
Corolla sub-rotate. Anthers large, exserted.	**6.**	**Gardneria.**

1. Mitreola oldenlandioides *Wall.*

An annual herb 6-18 ft. high. *Leaves* 1·3 by ·3-1·2 in., ovate-oblong or elliptic-ovate, entire, acuminate, membranous, usually puberulous or almost glabrous; lateral nerves 8-10 on either half; base narrowed into the petiole ·3 in. long; stipule reduced to a transverse line. *Flowers* 5-merous,

small, white, sessile or sub-sessile, axillary or terminal dichotomous cymes, often unilateral on the cyme branches. *Calyx*-segments glandular, sub-acute. *Corolla* lanceolate, lobe acute, valvate. *Ovary* 2-celled; ovules many in each cell on peltate placenta; style 2, short; stigma small, pilose, ultimately divergent. *Fruit* a lateral obcordate 2-horned capsule, recurved. *Seeds* obscurely angled, twice as long as broad.

KHASI & JAINTIA HILLS.

Flrs. & Fr. 10.

Mitrasacme nudicaulis *Reinw.*—A small annual herb is also recorded from KHASI HILLS, Nongkhlaw (4,000 ft.).

2. BUDDLEIA Linn.

Trees, shrubs or herbs, often tomentose. *Leaves* united by a stipulary line. *Flowers* 4-merous, in dense globose corymbiform cyme, axillary or in a terminal thyrsoid panicle. *Calyx* campanulate. *Corolla* tubular or campanulate; anthers sub-sessile, ovate or oblong. *Ovary* 2-celled; style filiform; stigma capitate or clavate; ovules numerous in each cell, many seriate. *Capsule* septicidally 2-valved. *Seeds* very many, oblong or fusiform; testa adpressed or laxly reticulate, often expanded into a wing or tail; albumen fleshy; embryo straight.

Seeds not tailed:—
  Flowers mauve in interrupted panicle of heads or clusters, tomentose, grey or tawny:—
    Leaf base not narrowed into the petiole. .. 1. *B. paniculata.*
  Flowers usually small, white, in cylindric spikes:—
    Extremities and undersurface of leaves clothed with soft grey tomentum:—
      Leaf base narrowed into the petiole. .. 2. *B. asiatica.*
Seeds tailed at both ends:—
  Flowers middle-sized, white, tinged with pink and orange:—
    Extremities and undersurface of leaves woolly with stellate hairs. .. .. 3. *B. macrostachya.*

1. Buddleia paniculata *Wall.*

A shrub with crooked stem; bark brownish grey, peeling off in long thin strips, extremities rusty-tomentose. *Leaves*

3-6 by 1-2 in., variable (lanceolate, oblong-lanceolate, ovate-oblong, elliptic-lanceolate, hastate) sinuate-dentate, crenate or sub-entire, acute or acuminate, membranous with deciduous tawny tomentum above, woolly beneath; lateral nerves slender, impressed above and indistinct, more prominent beneath; petiole ·5-1·5 in. long; stipules reduced to a interpetiolar line. *Flowers* fragrant, sub-sessile in pedunculate heads of clusters forming an irregular panicle. *Calyx* ·15-·2 in.; segments lanceolate, woolly outside, teeth short. *Corolla* pink and white, tomentose out-side, tubular, ·3 in. long; lobes rounded, obtuse. *Capsule* ellipsoid, about ·2 in. long.

NAGA HILLS, MANIPUR (5,000 ft.). (Mann's No. 203).

Flrs. 2-6.

2. Buddleia asiatica *Lour.* Vern. *Nuneheru-arong,* Mik.; *Dieng-lapane-dohkne, Dieng-srarrator,* Synt.; *Mar-kong-abang,* Miri; *Uuneheru,* Mikir; *Agia-chita, Posutia, Bonchini,* Ass.; *Chi-riel,* Tipp. & Kuki.; *Khundamara,* Mech; *Sam-likphu,* Kach.; *Dieng-tuti-myneng,* Kh.

A pretty shrub 10-12 ft. high, often gregarious. *Bark* thin, grey with prominent vertical ridges and also separating in thin flakes; blaze greenish; extremities clothed with soft grey tomentum. *Leaves* 1·5-7 by ·2-·3 in., narrow, lanceolate, acute, acuminate, minutely entire or serrulate, membranous, glabrous, dark green above, densely grey or white tomentose beneath; lateral nerves slender, 7-12 on either half; base narrowed into the petiole upto ·3 in. long. *Flowers* small, white, odorous, sessile or subsessile in cymose clusters on the rhachis of spiciform panicles, these again often panicled (Haines) terminal or axillary; bracts deciduous. *Calyx* ·05-·2 in., campanulate; teeth triangular. *Corolla* urceolate; lobes short, round, imbricate; anthers subsessile; stigma clavate. *Capsule* ·2-·3 in. long, ellipsoid, valves bifid. *Seeds* minute, not tailed.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, DARRANG, KAMRUP, GOALPARA, NOWGONG, CACHAR, SYLHET, N. C. HILLS, KHASI & JAINTIA HILLS ascending upto 5,000 ft.

Flowers are eaten cooked with rats' meat by Syntengs. Used in killing fish by poisoning the water by smashed twigs and leaves by the Mikirs.

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

3. Buddleia macrostachya *Benth.* Vern. *Ja-long-kren, Dieng-jalan-kren,* Kh.

A large shrub or a small tree upto about 15 ft. in height. *Bark* corky, longitudinally furrowed, dark; blaze white, turning yellowish. *Young* shoots 4-winged, innovations and inflorescence, undersurface of leaves and petioles woolly with stellate hairs. *Leaves* 2·5-10 by ·8-2·5 in., lanceolate-acuminate or acute, serrate, subcoriaceous, upper-surface dark green, at first stellate pubescent, ultimately glabrate; nerves impressed above, prominent beneath, 12-19 on either side of midrib, mostly meeting in loops near the margin; base recurved, rugulose, tapering to the very short channelled petiole; petiole ·1-·3 in. long, often brownish tomentose; stipules prominent, upto ·15 in. broad, dark green, rugulose. *Flowers* rose purple, ·5-·6 in. long, in sub-sessile cymes arranged on dense terminal spikes 3-5 in. long, elongating in fruit to 9 in. *Upper* leaf axils with small congested spikes terminating in short shoots or peduncled clusters of cymes; pedicels elongated in fruit; bracts filiform, upto ·2 in. long. *Calyx* persistent, about ·2 in. long, woolly outside, campanulate, 4-lobed; segments erect, triangular-acuminate, apex infolded. *Corolla* ·4-·5 in. long, hypocrateriform, pubescent and purplish outside, orange within, tube dilated at the base, sparsely stellate hairy inside at the throat and the upper portion; lobes 4, rounded, short, ·1 in. long. *Stamens* 4, subsessile; anthers introrse, dorsifixed, dehiscing by slits. *Ovary* woolly, 2-celled; style glabrous, clavate, persisting in fruit; ovules numerous on 2-axile placentas. *Capsule* about ·3 in. long, tapering at the apex, pubescent, septicially two-valved. *Seeds* small, tailed at both ends, upto about ·1 in. long.

KHASI HILLS above 4,000 ft.
Tomentum is usually grey at first, turns brown with age.

Flrs. 9-12. Fr. 4.

3. GELSEMIUM Benth.

Gelsemium elegans *Benth.*

A large woody evergreen glabrous climber; "bark corky: wood porous; vessels numerous, uniformly distributed" (Brandis). *Leaves* 1·5-4 by ·6-2 in., ovate, ovate-lanceolate, entire, acuminate, membranous, glabrous; lateral nerves about 6 on either half, rather obscure above, comparatively prominent beneath; base rounded, sometimes oblique; petiole ·1-·5 in. long. *Flowers* golden yellow, regular, in axillary compound 3-chotomous cymes. *Calyx* segments acute, reddish, margins minutely ciliate. *Corolla* funnel-shaped, ·4-·5 in. long; lobes obtuse, imbricate in bud. *Stamens* 5, inserted a little above the middle of the corolla tube; anther basifixed, somewhat sagittate. *Style* filiform; stigma 2-fid, each lobe is often split down the middle at the same height as the anthers. *Fruit* inflated, ·5 in. long, 2-celled. *Seeds* numerous, oblong.

KHASI HILLS, MANIPUR.
Root and leaves are very poisonous.
Flrs. & Fr. 1.

4. STRYCHNOS Linn.

Trees or scandent shrubs usually with short axillary clavate tendrils. *Leaves* opposite palmately or penninerved; stipules reduced to lines between petiole. *Flowers* 4-5-merous, in terminal or lateral bracteate cymes. *Calyx* small. *Corolla* salver-shaped, campanulate or rotate; lobes valate. *Stamens* inserted on the throats of the corolla; filaments short, filiform. *Ovary* 2-celled or 1-celled above; ovules many in each cell; stigma capitate or obscurely 2-lobed. *Fruit* baccate, usually globose with a hardened rind. *Seeds* 1-many, immersed in pulp, variously compressed or if solitary, globose; albumen copious, hairy; embryo short, cotyledons foliaceous; radicle terete, short.

Trees:—
  Leaves large; corolla tubular, pilose inside:—
    Leaves 5-nerved, gradually subacute, anthers non-apiculate:—
      Seeds orbicular. .. .. .. *1. S. Nux-vomica.*

Leaves 5-7 nerved, abruptly acute or acuminate; anthers apiculate:—
Seeds irregularly ovoid. .. .. 2. *S. Nux-blanda.*
Scandent or climbing shrubs:—
Leaves 3-nerved:—
Cymes axillary·—
Leaves ovate-lanceolate :—
Corolla lobes margins fimbriate. .. 3. *S. aenea.*
Cymes thyrsoid, axillary, sometimes terminal:—
Leaves ovate:—
Corolla villous within·—
Anther cells slightly hairy :—
Ovary hairy .. .. 4 *S. laurina.*
Leaves elliptic-oblong, suddenly caudate-acuminate:—
Corolla throat villous:—
Anthers glabrous:—
Ovary glabrous; style hairy. .. 5. *S. Wallichiana.*

1. Strychnos Nux-vomica *Linn.* Vern. *Makurikendu* or *Makurijab,* Ass.; *Kuchila, Thalkesur,* Beng.

A handsome middle sized or large tree. *Leaves* 3-6 by 2-4 in., broadly elliptic, ovate or sub-orbicular, obtuse or acute, coriaceous, glabrous, shining; basal nerves three strong and two slender ones from close to the base; base rounded or suddenly acute on the petiole; petiole ·3-·5 in. long. *Flowers* white or greenish white, in short peduncled terminal cymes, many flowered. *Calyx* glandular, very small; teeth acute. *Corolla* tube white, cylindric, ·3 in. long, slightly hairy near the base within; throat glabrous. *Style* filiform, glabrous; stigma entire. *Fruit* globose, yellow-orange, 2 in. across. *Seeds* discoid, satiny, ·75 in. in diameter, surrounded by a bitter pulp.

Kanjilal's No. 7619 collected by B. Sen Gupta at Silghat-NOWGONG (planted ?).

Contains two alkaloids, strychnine and brucine.

Flrs. 3-4. Fr. Cold season.

2. Strychnos nux-blanda *A. W. Hill.* Kew Bull., 1917, p. 189.

A small tree (45 ft. high); branches glabrous. *Leaves* 4·5-8·5 by 3-6·5 in., broadly ovate or elliptic, abruptly

acute or acuminate, glabrous, glossy on the upper side, 5-7 nerved, with nerves more or less prominent on the upper surface, but more conspicuous beneath, shaggy hirsute or glabrous; primary veins conspicuous; base rounded or roundish, cuneate or sometimes slightly cordate; petiole ·4-·6 in. long. *Inflorescence* corymbose, panicled, sparsely flowered, ·5-2·5 in. long, 1-1·5 in. broad; smaller branches axillary with 2-4 leaves at the apex; peduncles glabrous or sub-glabrous; pedicels papillose or minutely pubescent. *Calyx* segments narrow, elliptic-lanceolate, acute, ·05-·1 in. long. *Corolla* white, ·4-·5 in. long; lobes about ·12 in. long, elliptic-lanceolate, slightly papillose; tube slightly hirsute. *Anthers* ·06-1 in., apiculate, sub-sessile. *Ovary* glabrous; style ·4-·5 in. long, glabrous. *Fruits* globose, 2·3-3·3 in. across; pericarp glossy, verrucose and woody. ·06-·1 in. thick. *Seeds* 8-12, irregularly ovoid or more or less rounded, ·7-·9 by ·6-·8 in., sub-compressed.

MANIPUR (Kergalthan & Kaboo Valley, Watt No. 6628, 800 ft.).

Flrs. Rainy season. Fr. 1-2.

3. Strychnos aenea Var. acuminata A. W. Hill. Kew Bull., 1917, p. 138.

A scandent woody shrub. *Leaves* 3·5-4 by 1·5-1·7 in., more or less ovate, abruptly or gradually acuminate, chartaceous, bronze or copper coloured in the lower side, 3-nerved with 2 obscure pair at the base; nerves conspicuous, prominent on both sides, reticulate, cuneate or roundish beneath at the base; petiole small; tendrils bifurcate, glabrous. *Inflorescence* axillary, 1·2-1·4 in. long.

CACHAR, NAGA HILLS, KHASI HILLS (171 Prazer).
No specimen in the Forest Herbarium, Shillong.

4. Strychnos laurina *Wall.* Vern. *Hrui-khal*, Kuki; *Dukhonkha*, Garo; *Bogalata*, Ass.

An extensive climber, every part bitter; branches more or less angular, twisted. *Bark* brownish, shining. *Leaves* 3-6 by 1·25-3 in., ovate or elliptic, caudate-acuminate, sub-coriaceous, quite glabrous, 3-nerved; midrib more prominent

beneath; base rounded; petiole ·2-·4 in. long, channelled above. *Flowers* numerous in large pubescent thyrsoid panicle; buds obovoid. *Calyx* segments blunt, ciliate. *Corolla* campanulate, tawny villous within; lobes about ·1 in. long. *Stamens* inserted on the middle of the corolla tube. *Ovary* rounded, hairy, tapering into a conical style; stigma capitate. *Berry* globose, yellow when ripe, upto 2 in. in diameter (2 by 1·75 in.). *Seeds* velvety, flattened, brown, ·75 by ·6 in.

LAKHIMPUR, CACHAR, SYLHET & GARO HILLS.
Fruit used for worms, etc.

Flrs. 4. Fr. Cold season.

5. Strychnos Wallichiana *Benth.* Vern. *Thagwa-man-rikang*, Mik.; *Gonsila-soukha*, Kach.

Large woody scandent shrub, whitish, plain, terete; tendril forked or 2. *Leaves* 2-5·5 by 1-2·2 in., elliptic-oblong, entire, caudate-acuminate, chartaceous, glabrous, glossy green (not bitter), prominently 3-nerved, often with 2 slender nerves along the margins; base rather rounded; petiole ·1-·3 in. long. *Flowers* greenish, sweet-scented, in dense dichotomous compound corymbose cymes. *Corolla* tube cylindric, many times the length of the calyx, villous in the throat. *Anthers* glabrous. *Ovary* glabrous; style hairly. *Fruit* globose, slightly tapering at the apex, beaked, ·5 in. in diameter, greenish white.

SIBSAGAR, GOALPARA, SYLHET, CACHAR, N. C. HILLS, MIKIR HILLS, KHASI & JAINTIA HILLS.

Flrs. 4. Fr. 9.

S. quintuplinervis *A. W. Hill.*

A scandent or straggling shrub; stem, petiole and peduncle somewhat pubescent. *Leaves* 2·5-4 by 1·5-2·5 in., broadly ovate or ovate-lanceolate, acute or acuminate, glabrous, vernicose above; quintuplinerved; transverse veins distant; base rotundate or rotundately cuneate. *Inflorescence* axillary; corymbs multiflorous, ·6-·8 in. long. *Calyx* segments triangular-ovate, acute, ·04 in. long, ciliate at the margin. *Corolla* ·16 in. long; lobes ·06 in. long, ovate-acute. *Anthers* inserted inside the tube, ·25-·3 in. long, much barbate towards the base.

Ovary glabrous, ·75 in. long; one-ovuled; style glabrous. *Berry* ovoid, 1-1·2 in. long, smooth; pericarp crustaceous. *Seeds* ·8 in. long.

KHASI AND JAINTIA HILLS. (Umsaw Forests, Shillong Herbarium No. 11075).

Flrs. 4-5. Fr. 7.

5. FAGRÆA Thunb.

Glabrous trees or shrubs, often epiphytic, sometimes scandent. *Leaves* opposite, usually entire, coriaceous; petiole dilated at the base, auriculate or united by a stipulary sheath. *Flowers* 5-merous, whitish or yellowish, rarely pink, supported by a pair of bracteoles, in bracteate terminal or axillary cymes, rarely solitary. *Calyx* segments thick, persistent in fruit, much imbricate. *Corolla* funnel-shaped; lobes twisted in bud, the right hand edge overlapping. *Filaments* filiform or slender; anthers oblong. *Ovary* 2-celled, throughout or 1-celled above; style filiform; stigma capitate; ovules numerous in each cell. *Berry* 1-2-celled. *Seeds* immersed in pulp; tests crustaceous; albumen horny; embryo small, straight.

Corolla lobes 1-1·5 in. long:—
Fruit 1-1·5 in. long. .. .. .. 1. *F. obovata*
Fruit ·6-·75 in. long. .. .. .. 2. *F. khasiana.*

1. Fagræa obovata *Wall.* Vern. *Dieng-thiang*, Kh.; *Dieng-sarynkho*, Synt.

A small tree or shrub, often epiphytic, throwing out roots like a *Ficus* and clasping the stem with the annual roots; bark blackish and rough outside, fleshy, ·6 in. thick, uniformly light dun inside. *Leaves* 3-6 by 1-3 in., ovate-oblong or elliptic, entire, shortly and abruptly acuminate, coriaceous (terminal leaves fleshy), glabrous above, velvety tomentose beneath; lateral nerves obscure; midrib more prominent beneath; base cuneate; petiole ·2-·8 in. long; stipules more or less adnate to the petiole. *Flowers* white or cream coloured, 3 in. long in small terminal cymes; pedicels very short; bracts ovate or oblong, thick. *Calyx* segments thick, oblong-obtuse. *Corolla* upper half campanulate; lobes elliptic, obtuse, about 1·5 by 1 in., throat of

corolla transversely wrinkled inside. *Filaments* very slender; anthers large. *Berry* shining, slaty green, black when ripe, 1-1·5 in. long.

CACHAR, GARO HILLS, KHASI & JAINTIA HILLS ascending upto 5,000 ft

Flrs. 7 Fr Cold season

Var. Gardneri *Thw*.—Leaves 2-7·5 by 8-2 2 in., petiole 2-8 in. long

2. Fagræa khasiana *Benth.*

A middle sized tree (independent). *Bark* grey with faint vertical reticulating ridges. *Leaves* 3-8 by 2-3·8 in., elongate-elliptic or oblong-elliptic, entire, acuminate (drying light cinnamon colour and rugose) coriaceous, glabrous; lateral nerves very slender, about 10 on either half; base cuneate; petiole 1-1·5 in. long; stipules adnate (old leaves yellow). *Flowers* in terminal compound cymes; bracteoles thick, linear-lanceolate, acuminate. *Calyx* cleft about ¼ way down; segments obtuse, about ·3 in. long. *Corolla* funnel-shaped, 1·25 in. long; lobes about ·5 in. long *Fruit* ·6-·75 in. long.

KHASI & JAINTIA HILLS upto 4,000 ft.

Flrs 3-4 Fr. 7-9

6. GARDNERIA Wall

Large glabrous scandent or climbing shrubs. *Leaves* opposite, entire; petioles connected by a stipulary line. *Flowers* solitary or in pedunculate axillary cymes. *Calyx* small, deeply 4-5-partite. *Corolla* subrotate; lobes 4-5, thick, valvate in bud. *Stamens* 4-5, inserted on the corolla tube; filaments short; anthers sub-sessile; cells ovate, connivent or sub connate. *Ovary* 2-celled; style cylindric; stigma shortly 2-lobed; ovules usually 1 in each cell. *Berry* globose, usually 2-seeded; pericarp fleshy; albumen fleshy; embryo small; radicle inferior.

A large woody spirally twining climber:—
Flowers in dense 3-chotomous cymes :—
Leaves acute. .. .. .. *1. G. ovata.*

A scandent shrub, about 6-8 ft.:—
Flowers solitary in nodding peduncle :—
Leaves acuminate. .. .. .. 2. *G. angustifolia.*

1. Gardneria ovata *Wall.* Vern. *Mei-sinji-ong*, Kh.

A large woody climber; bark black, thin, plain; blaze yellowish green; stem spirally twinning. *Leaves* 2-5 by 1-2 in., elliptic or ovate-lanceolate, entire, acute, thinly coriaceous, glabrous; lateral nerves very slender, rather obscure above. *Flowers* greenish-yellow in pedunculate trichotomous cymes; bracteoles ·2-·3 in. long. *Calyx* segments rounded. *Corolla* lobes about ·2 in. long. *Anthers* connate on the lower portion. *Berry* scarlet, ·3 in. in diameter.

KHASI HILLS, ascending upto 2,000 ft.
Flrs. 4-6. Fr. Cold season.

2. Gardneria angustifolia *Wall.*

A large scandent shrub. *Leaves* 2-4 by ·6-1·2 in., lanceolate, entire, acuminate, chartaceous, glabrous; lateral nerves rather obscure, 6-9 on either half; base acute or rounded; petiole ·2-·3 in. long. *Flowers* about ·5 in. across, solitary on nodding filiform axillary peduncles (·4-1 in. long). *Calyx* ·15-·2 in. long; segments triangular. *Corolla* lobes ·2 in. long, villous or glabrate within. *Anthers* subsessile, sub-connate; cells ovate. *Berry* scarlet, ·3-·4 in. in diameter.

KHASI HILLS (Brandis).
Flrs. 5-7. Fr. Cold season.

FAM. 88. GENTIANACEÆ.

Mostly herbs (often perennial), rarely shrubs, usually bitter and glabrous. *Leaves* usually opposite, entire, exstipulate. *Flowers* usually regular, hermaphrodite, 4-5-merous, in bracteate cymes or clusters, rarely solitary. *Calyx* inferior; segments imbricate in bud. *Corolla* campanulate, funnel-shaped or salver-shaped; lobes twisted to the right, rarely imbricate or induplicate-valvate. *Stamens* alternate with the corolla lobes, epipetalous; filaments linear, sometimes dilated below; anthers usually introrse, dehiscing longitudinally or by apical pores. *Disc* 0, annular or of 5 glands. *Ovary* superior, usually 1-celled, placenta usually parietal, occasionally the ovary is 2-celled with axile placenta; ovules usually numerous, anatropous; style simple; stigma simple or 2-lobed. *Fruit* usually a septicidal capsule, rarely baccate. *Seeds* numerous, small, sometimes winged; albumen abundant; embryo small.

I. Terrestrial herbs; leaves opposite :—
  A. Flowers regular :—
    Ovary 2-celled; style filiform :—
      Flowers blue-purple or white. .. **1. Exacum.**
  B. Flowers irregular; style filiform; stigmas 2. .. .. .. **2. Canscora.**
    Ovary 1-celled; style short or 0 :—
      Corolla lobes without pits depressions or spurs at the base :—
        Erect herbs :—
          Corolla tubular campanulate :—
            Flowers usually blue. .. **3. Gentiana.**

II. Twiners :—
  Corolla tubular-campanulate :—
    Stamens attached to the tube. .. **4. Crawfurdia.**
  Corolla lobes with depressions or spurs at the base :—
    Corolla lobes with 1-2 glandular nectaries. .. .. .. **5. Swertia.**

III. Aquatic plants :—
  Leaves alternate or sub-opposite :—
    Corolla-lobes induplicate-valvate. .. **6. Limnanthemum.**

1. EXACUM Linn.

Exacum tetragonum *Roxb.* Vern. *Sher-ri-takti*, Kh. (=chireta of damp places).

An erect herb; stem 1-6 ft., quadrangular. *Leaves* 2-5 by ·5-1 in., decussate, sessile, lanceolate-acuminate, entire, membranous, glabrous, 3-5-nerved. *Flowers* azure blue, 4-merous (rarely 1) in many flowered panicles; bracts upto ·5 in. long, narrowly lanceolate or linear. *Calyx* keeled, almost winged. *Corolla* lobes ·75 in. long, ovate-acute; anthers yellow, ·3 in. long, erect. *Capsule* subglobose or ellipsoid, ·3 in. in diameter.

N.-E. F. TRACT, DARRANG, KAMRUP, KHASI and JAINTIA HILLS, upto 4,500 ft.

The plant is used as a tonic in fever and as a stomachic, bitter (Pharmacopœia Indica).

Flrs. 5-7. Fr. Cold season.

E. teres *Wall.*, also is recorded from KAMRUP.

2. CANSCORA Lamk.

Conscora andrographioides *Griff.*

A weed, as an under-growth in Hollong-Makai-Nahor forest. *Branches* quardrangular. *Leaves* ·7-2 by ·3-·6 in., 3-5-nerved, hastate or lanceolate, acuminate, entire; petiole ·1 in. long. *Flowers* in axillary few flowered cymes. *Corolla* lobes obovate, obtuse, veined. *Capsule* oblong, nearly as long as the calyx.

LAKHIMPUR (Jeypore reserve), KHASI & JAINTIA HILLS, upto 4,000 ft.

Flrs. 2. Fr. Rainy season.

Canscora decussata *Roem.*

An erect herb 6-20 ft.; stem with 4-winged branches. *Leaves* ·5-1 by ·2-·3 in., 3-nerved, sessile, lanceolate-ovate or oblong-lanceolate. *Flowers* irregular, sub-labiate, white in lax cymes. *Calyx* 4-winged. *Corolla* lobes obovate; tube as long as the calyx. *Stamens* 1 perfect, conspicuously larger than the others. *Capsule* oblong. *Seeds* brown.

GARO HILLS.

The plant is regarded as a laxative, alterative and tonic, and is much praised as a nervine tonic. (Dutt).

Flrs. & Fr. Cold weather.

3. GENTIANA Linn.

Glabrous or nearly glabrous annual or perennial herbs, mostly of tufted growth. *Flowers* blue yellow or white. *Inflorescence* axillary or terminal. *Calyx* tubular, rarely keeled; segments 4-5. *Corolla* tubular, campanulate or funnel-shaped; lobes 4-5, often with folds between the lobes. *Stamens* 4 or 5, included; filaments linear, somewhat flattened below; anthers oblong or ovate. *Ovary* 1-celled; ovules many; style usually short; stigma bilobed. *Capsule* sessile or stalked, oblong or ellipsoid.

Nearly all the species of the genus are more or less bitter (stem and root) and many are of great medicinal importance and value.

G. lutea *Linn*, yields the real *Gentiana root.*

1. Gentiana tenella *Fries.* Var. sikkimensis clarke.

A delicate erect diffuse herb. *Leaves* ·3-·6 by ·1-·3 in. *Flowers* 5-merous. *Calyx* bell shaped. *Corolla* dirty violet, 5-lobed; stigma foliaceous. *Capsule* sessile, about ·6 in. long.

KHASI and JAINTIA HILLS, 5,500 ft.
Used in Lahoal as a decoction for fever (Ailderson).

Flrs. 7-8. Fr. Cold season.

2. Gentiana quadrifaria *Bl.*=G. pedicelleta Wall (in part).

An erect herb. *Leaves* ·2-1 by ·1-·4 in.; radical leaves rosulate, yellowish green. *Flowers* blue, ·3 in. long, in terminal cymes. *Capsule* stalked, ovoid or ellipsoid.

KHASI and JAINTIA HILLS.

4. CRAWFURDIA Wall.

Crawfurdia campanulacea *Wall.* Modern name Gentiana campanulacea (Wall and Griff.) nov. comb.

A twiner. *Leaves* 1·5-3 by 1-1·5 in., opposite, elliptic-acuminate, entire, minutely denticulate, rather membranous,

glabrous, margins recurved, 3-nerved; nerves impressed above, strong beneath; petiole channelled, ·1-·2 in. long. *Flowers* axillary; peduncles 1-flowered, one long (4-5 in.) and another short (·25-·75 in.) of the same pair, the longer one flowering much earlier. *Calyx* tube long, conical, ·75 in. long, 5-angled; lobes ovate-acuminate, green, recurved, spreading, about ·1 in. below the truncate end of the tube, ·5 by ·25 in. *Corolla* purple, about 2 in. long, pitcher-shaped, distinctly plicate; tube 1·5 in. long; lobes deltoid with horizontal sinuses as wide as the width of the lobes. *Filaments* dilated. *Stigma* curled, black. *Disc* 5-glandular. *Capsule* about 1 by ·2 in., terete. *Seeds* discoid, winged, all round.

KHASI HILLS, upto 6,000 ft.

Flrs. & Fr. Cold season.

Crawfurdia fasciculata *Wall.* Modern name Gentiana fascicularis Marq. Kew. Bull., 1931: 70; 1937: 156; also occurs in KHASI HILLS.

5. SWERTIA Linn.

Annual or perennial herbs. *Leaves* usually opposite. *Flowers* 4-5-merous, blue, lurid or white, regular, sometimes with yellow nectaries, in terminal corymbose or panicled cymes. *Calyx* segments lanceolate, acute. *Corolla* rotate; lobes twisted to the right in bud, each having 1 or a pair of glandular nectaries at the base. *Stamens* free or slightly joined in a ring; filaments often more or less dilated; anthers versatile. *Ovary* 1-celled; the placentas slightly intruded; style short or 0; stigmas bilobed; ovules many. *Capsule* sessile, 2-valved, ovoid or oblong. *Seeds* many, minute, often winged, reticulate.

Flowers 5-merous :—

One gland on each corolla lobe, much reflexed, red-purple or dark-red. .. .. 1. *S. purpurascens.*

Flowers 4-merous :—

Corolla green, variously tinged:—

2-glands on each corolla lobe. .. .. 2. *S. Chirata.*

Corolla pale-blue with darker veins :—

One small orbicular gland on the base 3. *S. pulchella.*

1. Swertia purpurascens *Wall.* Vern. *Chireta,* Beng. & Kh.

A small annual herb. *Leaves* ·5-1 by ·1-·3 in. *Panicle* many flowered. *Capsules* stalkless. *Seeds* minute, globose, yellowish when mature.

KHASI HILLS, 6,000 ft.

Flrs. 8-9. Fr. Cold season.

2. Swertia Chirata *Ham.* Vern. *Chireta,* Beng. & Kh.; *Kirata-tikta,* Sans.

A perennial herb, with rooting stem. *Leaves* 1-3 by ·6-1·3 in., subsessile, 5-nerved.

KHASI HILLS, 6,000 ft.

The drug obtained from the dried plant is held in high esteem for its medicinal properties as a tonic, febrifuge and enthelmintic. It is a bitter tonic administered in the form of infusion or tincture and now officinal in British Pharmacopœia.

Other species mentioned above are used as substitute for *S. Chirata* (true Chireta).

Flrs. 9-10. Fr. Cold season.

3. Swertia pulchella *Ham.* Vern. *Chireta,* Beng. & Kh.

A small herb. *Leaves* ·3-1·3 by ·1-·6 in., subsessile, 3-nerved.

KHASI HILLS, 6,000 ft.

Flrs. 8-9. Fr. Cold season.

S. cordata *Wall.*

A small annual herb upto 3 ft. high. *Leaves* ·6-1 by ·4-·7 in., ovate-acute, often cordate, 3-5-nerved, sessile. *Flowers* in many flowered panicles. *Corolla* yellowish-white; margins streaked purplish. *Filaments* linear, free. *Style* cylindric; stigma almost hemispheric.

KHASI and JAINTIA HILLS, 3-5,000 ft.

S. dilatata *Clarke.*

A glabrous herb, about 30 in. high; stem obscurely lineolate. *Leaves* sessile, about 2 in. long, linear-lanceolate, glabrous. *Flowers* in thyrsoid panicles. *Calyx* lobes narrow, lanceolate-acuminate, ·3 in.

long. *Corolla* yellowish. *Filaments* dilated (not connate at base); capsule oblong-ovoid, ·4-·5 in. long.

KHASI and JAINTIA HILLS (3,000 ft.).

Flrs. & Fr. Cold season.

S. paniculata *Wall.*

A herb resembling Swertia purpurascens *Wall.* *Leaves* oblong or lanceolate, 1-3-nerved. *Calyx* segments ·2 in. long, acute. *Corolla* lobes ovate-acute, ·25 in. long. *Filaments* linear, separately inserted on the corolla tube. *Style* long; stigma linear. *Capsule* ·3 in. long, acuminate.

ASSAM (Kew Bulletin, 1932).

S. macrosperma *Clarke.*

A herb; stem quadrangular. *Leaves* sub-sessile, 1·75 by ·3 in., oblong or sub-ovate, acute. *Corolla* lobes ·75 in. long, biglandular near the base, lanceolate. *Filaments* linear; anthers hastate. *Stigmas* sub-sessile. *Capsule* ·3 by ·16 in. *Seeds* few, smooth, ellipsoid.

KHASI HILLS (4-6,000 ft.)

Flrs. & Fr. 7-11.

S. nervosa *Wall.*

A herb; stem 4-lineolate or 4-winged. *Leaves* 1·5 by ·6 in., elliptic-lanceolate, 3-nerved; base narrowed. *Panicles* many flowered. *Calyx* segments oblong-linear, ·6 in. long. *Corolla* lobes ovate-acute with one orbicular gland at the base. *Filaments* linear. *Stigma* sub-sessile, hemispheric. *Capsule* ·3 in. long, ovate.

ASSAM (Kew Bulletin, 1932).

Flrs. & Fr. 8-11.

S. Lacei *Craib.*

An erect herb. *Leaves* 1·5 in. long, sessile, linear, mucronulate, rigid, recurved; lateral nerves almost obscure. *Cymes* many flowered. *Calyx* segments 4, ·2 in. long, linear-lanceolate, acute. *Corolla* tube short; lobes ·3 in. long, elliptic or obovate-elliptic, obtuse. *Filaments* ·12 in. long, slightly dilated; anthers ·05 in. long. *Pistil* ·16 in., glabrous.

NAGA HILLS.

6. LIMNANTHEMUM S. P. Gmel.

Limnanthemum cristatum *Griseb.*

An aquatic herb. *Stem* rooting at the nodes, petiole-like. *Leaves* 1·5-4 in. across, orbicular, floating, deeply

cordate; petiole upto 2 in. long. *Flowers* dimorphic in dense clusters. *Corolla* lobes glabrous with a longitudinal crest down the middle. *Capsule* sub-globose. *Seeds* barbed or prominently tubercled.

ASSAM, North Trunk Road (54th mile).

Flrs. 4-5. Fr. Autumn.

FAM. 89. POLEMONIACEÆ.

Herbs or shrubs, sometimes scandent, often glandular. *Leaves* usually exstipulate. *Flowers* regular or slightly zygomorphic, hermaphrodite, 5-merous, usually in cymes (sometimes condensed into involucrate heads). *Calyx* inferior; segments valvate or imbricate, persistent. *Corolla* variously shaped; lobes twisted in bud. *Stamens* epipetalous, alternate with the corolla lobes. *Ovary* 3-celled (rarely 2-5), situated on a disc; style simple, more or less lobed at the tip; ovules 1-many in each cell, sessile, anatropous. *Fruit* usually a loculicidal capsule. *Seeds* albuminous; embryo straight.

Cobæa scandens *Cav.*

A large climber with perennial leaves. *Leaf* rachis terminating in a branched tendril for climbing. *Flowers* green to pale yellow and large, more or less zygomorphic. *Corolla* campanulate; bracts large, cordate, purple; nectary with a large quantity of thin honey.

Cultivated in Shillong garden. Ornamental climber of rapid growth.

Flrs. 11.

Phlox drummendi *Hook.* A well-known garden plant cultivated throughout India.

FAM. 90. HYDROPHYLLACEÆ. (By C. B. Clarke).

Herbs, rarely undershrubs, upsually hairy, sometimes glandular hairy. *Leaves* simple or compound, exstipulate, usually alternate, rarely opposite. *Flowers* bisexual, regular, usually 5-merous. *Inflorescence* various. *Calyx* inferior; segments imbricate. *Corolla* usually rotate; lobes usually imbricate. *Stamens* on the corolla tube and alternate with the lobes; filaments often hairy with scale-like appendages at the base. *Ovary* superior, bi-carpillary (1-2-celled); style 1-2; stigma capitate; ovules 2-many in each cell, sessile or pendulous, anatropous. *Fruit* usually a loculicidal capsule; albumen rich. *Seeds* minute; embryo small.

(Honey is secreted below the ovary and protected by the appendages of the stamens).

Hydrolea zeylanica *Vahl.*

A swamp weed making a matted covering often found in rice fields. *Leaves* about 4 by 1 in., lanceolate-acuminate, upper gradually smaller, sessile or shortly petioled. *Flowers* deep bluish purple, solitary or in cymes. *Calyx* deeply 5-partite, patently hairy, the thicker hairs glandular. *Corolla* rotate, bright bluish purple with a greenish white centre; lobes broadly ovate. *Filaments* dilated at base; anthers versatile; style 2, wide apart. *Seeds* numerous, oblong, on large fleshy central placenta; pericarp membranous.

SIBSAGAR, LAKHIMPUR, KHASI & JAINTIA HILLS.

Flrs. 11-12. Fr. Hot weather.

FAM. 91. BORAGINACEÆ.

Herbs, shrubs or trees, very rarely climber, often with cystoliths or hispid hairs. *Leaves* usually alternate, exstipulate. *Flowers* usually 5-merous, regular, hermaphrodite, rarely polygamous, normally in dichotomous or scorpioid cymose or 3-chotomous panicles. *Calyx* inferior, usually persistent and often accrescent in fruit. *Corolla* often with scales in the throat, imbricate (rarely twisted) in bud. *Stamens* epipetalous, alternate to corolla lobes; anthers introrse. *Disc* often present, annular, hypogynous. *Ovary* superior, of 2 median carpels, 2-celled, but soon usually 4-celled by false septa; ovules sub-erect from the innner angles of each cell, 2 in each cell (2-celled) or 1 in each cell (4-celled); style terminal or gynobasic, simple or forked; stigma capitate or 2-lobed. *Fruit* drupaceous or of 2-4 achenes or nutlets. *Seeds* straight or curved; albumen scanty; embryo straight or curved; cotyledons flat, planoconvex; radicle superior.

Ovary entire. Fruit drupaceous (1-4-celled) :—

Style terminal, twice bilobed :—

Calyx teeth short, irregular, accrescent in fruit :—

Trees or shrubs. .. .. .. **1. Cordia.**

Style simple, once bilobed or climbed to the base or entire (no ring of hairs) :—

Style 2 or once 2-fid :—

Trees or shrubs. .. .. .. **2. Ehretia.**

Style 1, undivided; stigma capitate :—

Virgate shrub. .. .. .. **3. Rhabdia.**

Style depressed, conical at the apex or with a ring of hairs near the tip of style :—

Shrubs often scandent :—

Style short, shortly 2-lobed; pyrenes 2-seeded. .. .. **4. Tournefortia.**

Style gynobasic; nutlets attached to a calyx or conical carpophore; nutlets glochidiate. .. .. .. **5. Cynoglossum.**

1. CORDIA Linn.

Trees or shrub, sometimes sub-scandent, often with cystoliths. *Leaves* alternate, rarely sub-opposite, often with a marginal nerve, petiolate. *Flowers* polygamous, ebracteate, in dichotomous corymbose cymes or clusters. *Calyx* campanulate or tubular, accrescent in fruit; segments short, irregular or obscure. *Corolla* tubular or funnel-shaped; lobes usually 4-8, white, recurved, imbricate. *Stamens* 4-8, adnate to the tube, usually hairy at the base; anthers exserted. *Ovary* 4-celled; ovules 1 in each cell; style twice 2-partite; stigma capitate or clavate. *Fruit* drupaceous, ovoid or ellipsoid, usually with veined pulp; putamen hard, 1-4-celled, usually 1-seed fertile. *Seeds* exalbuminous; cotyledons plicate; radicle short.

Flowers small, white. Corolla tube as long as or shorter than the calyx. Stamens usually 4-5. Leaves alternate, sub-3 nerved :—

Cystolith cells not conspicuous on the upper surface of leaves. Leaves not tomentose beneath but rough; basal nerves 3-5. A middle-sized tree. .. .. .. 1. *C. dichotoma.*

Cystolith conspicuous as raised, generally white discs on the upper surface. Calyx not ribbed :—

Underside of leaves glabrous, sparsely hairy. A large tree. .. .. .. 2. *C. grandis.*

Leaves grey tomentose beneath. A middle-sized tree. .. .. 3. *C. fragrantissima.*

1. Cordia dichotoma *Forst*=C. Myxa Linn. Vern. *Bolmimang, Thekhaksum,* Garo; *Kotra, Boal, Goborhuta,* Ass.; *Aslia,* Sylh.; *Phai-imhuk,* Tipp.; *Dieng-mong,* Kh.; *Doba-Khari,* Mech; *Muk,* Lush.; *Dieng-soh-kh-mow, Dieng-pyrluh,* Synt.; *Bahari,* Nep.; *Siumang-asing,* Miri.

A middle sized deciduous tree with a long bole and drooping branches; bark ashy or brownish with shallow longitudinal wrinkles. *Leaves* variable, 1-5 by 1-3·3 in., broad-ovate, orbicular or elliptic-oblong, entire, sinuate or crenate, acute or bluntly acuminate, coriaceous, sparsely hairy beneath when young (especially on the nerves) more or less rough above; lateral nerves 4-6 on either half, first

pair sub-basal; base rounded or cuneate; petiole ·5-1·5 in. long. *Flowers* white, fragrant in corymbose often panicled cymes. *Calyx* not ribbed, globose in bud, funnel-shaped, soon becoming accrescent. *Corolla* ·1-·12 in.; tube hairy within. *Fruit* conical when young, yellow and glossy when ripe, ovoid, ·75 in. in diameter, usually 1-seeded, filled with a viscid sweetish pulp.

Throughout Assam ascending upto 5,000 ft.

Flrs. 3-4. Fr. 6-8.

Var. brunnea *Kz.* A small tree. *Bark* greyish brown, exfoliating in irregular flakes; young shoots pubescent. *Fruit* 1 in. in diameter.

SYLHET, GARO HILLS, KHASI HILLS, (2,800 ft.).

Flrs. 3-4. Fr. 6-7.

2. Cordia grandis *Roxb.* Vern. *Kotra,* Kam.; *Kala-uja,* Sylh.; *Bowal, Gobor-hutta,* Ass.; *Bol-dubak, Bol-munang,* Garo; *Dieng-jaing-nep,* Kh.; *Dersim,* Kach.

Tree (40′/70′) with a spreading crown. *Bark* light grey, very fibrous and hard; inside light brown with distant broad streaks of white tissue but instantly turning dark dirty brown. *Leaves* 2-8 by 1·5-7 in., orbicular, broadly ovate, entire, sessile or acuminate, obtuse, coriaceous, harsh with conspicuous whitish cystolith disk above, more or less felted beneath, 3-5-nerved; base cuneate, rounded or truncate; petiole slender, ·5-4 in. long. *Flowers* white in dense pedunculate panicled cymes. *Calyx* not distinctly ribbed, tubular, campanulate, ·2 in., accrescent in fruit. *Corolla* ·1-·15 in. long. *Fruit* white, usually 1-seeded, ellipsoid, ·5 in. with a viscid pulp.

KHASI & JAINTIA HILLS, SIBSAGAR, GARO HILLS, NOWGONG, KAMRUP.

Flrs. 11-12. Fr. 3-4 (persists till the ending of cold weather).

3. Cordia fragrantissima *Kurz.* Vern. *Mahidal,* Cach.; *Lamuk laba,* Manip.; *Mukchal,* Lush.; *Chasim-phang,* Kach.; *Bahari,* Ass.; *Imhuk,* Tipp.; *Kawa-thuthi, Kaladuti,*

Sylh.; *Amuk-thing,* Kuki; *Chorsim-soh-arong,* Mik.; *Hem-mukching,* Naga.

A middle sized tree. *Bark* brownish grey with light parallel vertical fissures; inside brown with thin papery flakes turning dark brown. *Leaves* 2-8 by 1·5-6 in., ovate or orbicular, entire or sinuate, obtuse, chartaceous, harsh above, with cystoliths disks, sparingly hairy, stellately soft tomentose beneath, 3-nerved; base cuneate or rounded; petiole 2-3·5 in. long. *Flowers* white, usually 4-merous, fragrant, ·25 in. across, almost sessile, in panicled unilateral racemes, mouth of corolla hairy. *Fruit* ellipsoid, ·3 in. in diameter.

LUSHAI HILLS, CACHAR, N. C. HILLS, SYLHET, GARO HILLS, SIBSAGAR, DARRANG, NOWGONG, KHASI & JAINTIA HILLS.

Heart wood vertically mottled, scented, much prized. This timber deserves notice and is likely to be in great demand as house posts.

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

Cordia Clarkei *Brace.*

A large tree (Prain). *Leaves* white, dotted above, densely tomentose beneath. *Calyx* densely tomentose. *Corolla* white; tube scarcely longer than the calyx. *Fruit* size of a pea.

NAGA HILLS.

2. EHRETIA Linn.

Trees or shrubs (blaze pale, rapidly turning brown on exposure). *Leaves* alternate. *Flowers* pentamerous, small, white, in terminal or axillary panicled cymes, rarely solitary. *Calyx* small, sub-5-partite. *Corolla* tube short, cylindric; lobes imbricate in bud. *Stamens* on the corolla tube. *Anthers* exserted. *Ovary* 2-celled; style terminal, bifid or 2-partite; stigma small, capitate. *Fruit* drupaceous with one 4-celled, two 2-celled or four 1-celled pyrenes, 1 or more often is reduced by suppression. *Seeds* straight; testa thin; albumen scanty; cotyledons small, oblong or ovate (not plaited).

Trees :—
Flowers panicled and cymose :—
Leaves serrate. .. .. .. *1. E. acuminata.*

Leaves quite entire. Corolla rotate or broadly campanulate:—		
Inflorescence sub-axillary, 3 in. across ..	2.	*E. lævis.*
Inflorescence axillary, large, 6 in. across :—		
Corolla tubular.		*E. lævis.*
Inflorescence pubescent, compact cymes, mostly at the ends of lateral branchlets.		*Var. floribunda.*
	3.	*E. Wallichiana.*

1. Ehretia acuminata *Br.* Vern. *Kala-uja,* Cach.; *Lamuk,* Manip.; *Bojo,* Mech.; *Bol-artok,* Garo; *Jari-gach, Uozal, Pojhar, Gual,* Ass.; *Susang-asing, Sisho-payang,* Miri; *Changi-more,* Duff.; *Chelwan-arong, Chorsing-soh,* Mik.; *Jasim-jolu,* Kach.; *Dieng-basier,* Kh.

A tree (80′/45″) large; stems more or less fluted. *Bark* grey with vertical fissures, ·5 in. apart, ·3 in. thick, composed of many fibrous ribbons; blaze whitish, rapidly turning dirty brown. *Leaves* 2-6 by 1-2·5 in., elliptic, elliptic-oblong, acuminate, acute, sharply serrate, chartaceous, glabrescent, shining above; lateral nerves 8-10 on either half; petiole ·5-1·5 in. long. *Flowers* white with an unplesant smell, in terminal dense pyramidal panicle. *Calyx* small, ciliate. *Corolla* tube short; lobes ·12 in., reflexed; style bifid for less than half its length. *Drupe* 1·2-·16 in. in diameter, ellipsoid with two 2-celled pyrenes, 4-seeded.

CACHAR, GOALPARA, GARO HILLS, DARRANG, N.-E. F. TRACT, LAKHIMPUR, SIBSAGAR, NOWGONG, KHASI HILLS ascending upto 4,000 ft.

Wood light brown, fairly compact, easily worked, used for agricultural implements (weight 37 lbs. per c. ft.). The fruit is eaten and the leaves are used as cattle fodder.

Flrs. 3-4. Fr. Cold season.

2. Ehretia lævis *Roxb. Vern. Hanbuok-arong, Thengbo-mum-arong,* Mik.

A middle sized tree, with spreading crown and irregularly shaped trunk. *Bark* nearly grey, split both vertically and horizontally, about ·5 in. thick, greenish below the cuticle; inner substance soft yellow, not fibrous. *Leaves* 2-6 by 1·5-4 in., elliptic-ovate, entire, acuminate or obtuse,

membranous when young, fleshy when mature, shining above, dark green or glabrous except with the presence of a small tuft of hairs at the axils of the nerves beneath; lateral nerves 6-10 on either half; base cuneate or rounded; petiole ·3-·8 in. long. *Flowers* white in dichotomously branched sub-axillary scorpioid cymes. *Calyx* usually pubescent, oblong-lanceolate, hardly accrescent. *Corolla* tube ·1 in.; lobes ·12 in., spreading, acuminate; style bifid. *Drupe* ·2 in. in diameter, sub-globose, 4-ribbed.

DARRANG, N. C. HILLS, LAKHIMPUR.

Wood fairly durable, sometimes used for agricultural implements. The leaves are used as cattle fodder.

Flrs. 3-4. Fr. Cold season.

Var. floribunda *Brand. Leaves* 2·5-7 by 1·3-3·5 in.; petiole ·3-1 in. *Inflorescence* axillary collected towards the ends of the branchlets, 6 in. in diameter.

N. C. HILLS (Dehing river).

Flrs. 1.

3. Ehretia Wallichiana *Hk. f. & T.*

A middle sized tree; bark greyish brown, irregularly fissured, corky outside; inside dull white, mottled pale yellow but quickly turning very dark brown, softly fibrous. *Leaves* 3-6·5 by 1·5-3 in., elliptic or oblong, entire, acuminate, coriaceous, glabrous; lateral nerves about 7 on either half, sub-parallel, arcuate; base cuneate or obtuse; petiole ·5-1 in. long. *Flowers* ·5 in. long, fragrant, (before the leaves) in corymbiform minutely pubescent compact cymes, mostly at the ends of lateral branchlets from the axils of previous years' leaves. *Calyx* about ·12 in., green; segments acute. *Corolla* tubular; tube ·3 by ·16 in.; lobes ovate, recurved. *Stamens* exserted; anthers variable. *Style* 2-fid near apex. *Drupe* sub-globose, longitudinally ribbed; pyrenes compressed.

GARO HILLS, SIBSAGAR.

Flrs. 3-4. Fr. Cold season.

Ehretia macrophylla *Wall.*

A tree. *Leaves* 4-7 by 4 in., broadly elliptic, unequally serrate, acute, rough with stiff hairs above, softly hairy beneath; base more or

less conical or rhomboid; petiole ·6-·8 in. long. *Flowers* in short rounded terminal panicles. *Calyx*-segments ·16 in. long, oblong-lanceolate. *Corolla* tube more than twice the length of the calyx. *Fruit* ·5 in. across, globose. mucronate; pyrenes 2, each 2-celled.

NAGA HILLS.

3. RHABDIA Mart.

Rhabdia lycioides *Mart.* Modern name Rotula aquatica Lour. Vern. *La-khowang,* Kh.; *Tui-pui-sulla,* Lush.; *Singkhantha,* Garo.

A shrub; branches erect or persistent (growing along the beds of streams). *Leaves* ·3-·8 by ·1-·2 in., often fascicled on branchlets, linear-oblong or linear-lanceolate; lobes acute, entire, rather membranous, sparsely hairy, narrowed into a short petiole ·05 in. long. *Flowers* pink, 5-merous (rarely 6) in 2-3 flowered shortly pedunculate cymes at the ends of short lateral branchlets. *Calyx* persistent, pubescent; segments lanceolate, acuminate. *Corolla* glabrous. *Ovary* 2-celled or sub-4-celled; stigma minutely 2-lobed. *Fruit* ·17 in. in diameter, scarlet, fleshy, glossy with a red juice, pyrenes 4.

"Ropes are made from the tough split stems" (Haines).

Flrs. 10-1. Fr. 12-3.

4. TOURNEFORTIA Linn.

Trees or shrubs, often rambling or sub-scandent. *Leaves* entire, alternate. *Flowers* white or greenish yellow, 4-5-merous, in terminal rarely lateral dichotomous scorpioid cymes. *Calyx* segments ovate or lanceolate. *Corolla* tube usually cylindric, naked in the throat, hairy outside; lobes spreading. *Stamens* included; filaments short; anthers oblong. *Ovary* 4-celled; style short, terminal. *Fruit* drupaceous, small, ovoid with two 2-seeded pyrenes.. *Seeds* straight or curved, albuminous; testa thin; cotyledons oblong.

Rambling or sub-scandent shrub:—
  Corolla 5-merous; drupes sessile :—
    Calyx teeth ·1 in.:—
      Corolla tube ·16 in. .. .. *1. T. viridiflora.*

Leaves softly hairy beneath, distinctly reticulated, lineate.		*Var. Griffithii.*
Corolla tube ·25 in. long.	2.	*T. Candollii.*
Calyx teeth short, exceeding ·16 in. :—		
Corolla tube exceeding ·25 in.	3.	*T. khasiana.*

1. Tournefortia viridiflora *Wall.* Vern. *Shamshog-asim-doukha,* Kach.; *Gondhai,* Manip.

A woody sub-scandent shrub; young parts hairy. *Leaves* 2-5 by 1-2·5 in., oblong-ovate, ovate-lanceolate, entire, acuminate, rather membranous, sparsely hairy above but with minute cystolith discs, softly hairy beneath; lateral nerves slender, impressed above about 7 on either half, oblique; base obtuse or rounded; petiole ·1-·5 in. long. *Flowers* 5-merous, in unilateral dense scorpioid spikes arranged in dichotomous terminal rusty villous cymes. *Calyx* segments ·1 in., about half the length of the tubular corolla, ·17 in. *Fruit* drupaceous, sessile, white and succulent when ripe, ovoid, beaked with the persistent style, ·04 in. in diameter.

SYLHET (Wall), N.-E. F. TRACT, DARRANG, SIBSAGAR, NOWGONG, KAMRUP, CACHAR, N. C. HILLS and KHASI & JAINTIA HILLS ascending upto 3,000 ft.

Convalescent babies are bathed with an infusion of the roots. Leaves are used as vegetable by Manipuris.

Flrs. 4-9. Fr. Cold weather.

Var. Griffithii. Bark ·25 in., thick, black, having minute vertical lenticels; blaze greenish, turning brown. *Leaves* distinctly reticulated beneath.

LAKHIMPUR.

Flrs. 3-4.

2. Tournefortia Candollii *Clarke.*

A shrub; young parts rusty villous. *Leaves* 1·3-4 by ·5-3 in., ovate-lanceolate, entire, acuminate, rather membranous, softly rusty villous; lateral nerves 7-9 on either half, impressed above, slender but more prominent beneath; base narrowed into the petiole, sometimes obtuse or rounded; petiole ·1-·8 in. long. *Flowers* fragrant, at first mauve, turning nearly white, in terminal rusty pubescent, dichotomous cymes consisting of scorpioid spikes. *Calyx* segments

·1 in. *Corolla* tube ·25-·35 in.; mouth of corolla tube yellowish green. *Fruit* sessile.

SIBSAGAR, MANIPUR, KHASI & JAINTIA HILLS, 5,500 ft.
Flrs. 11-1. Fr. Hot weather.

3. Tournefortia khasiana *Clarke.*

A rambling pubescent shrub. *Leaves* 3-5 by ·9-1·5 in., ovate, ovate-lanceolate, acuminate, membranous, sparsely puberulous above, pubescent beneath; lateral nerves about 4 on either half, slender, oblique; base rounded or shallow cordate. *Flowers* in rusty pubescent scorpioid cymes, often much branched. *Calyx* ·15 in.; segments linear-lanceolate, acuminate. *Corolla* ·4 in. *Drupe* ·15 in., ovoid, glabrous (black when dry) crowned with the remains of the style.

KHASI HILLS (1,500 ft.).
Flrs. 1. Fr. 5.

Heliotropium strigosum *Willd.*

A small intricately branched herbaceous plant, rather stout (even woody) with harsh depressed hairs. *Leaves* ·2-·7 in. long, linear-lanceolate; margins recurved. *Flowers* white, usually in simple spikes. *Calyx* strigose; sepals lanceolate or ovate-lanceolate. *Corolla* strigose; lobes ovate, plicate. *Anthers* with a long acuminate connective. *Stigma* bluntly conical. *Nutlets* ·06 in., hispid above, greyish.
NORTH-EAST FRONTIER TRACT—Pasighat.
Flrs. & Fr. 7 (almost throughout the year).

5. CYNOGLOSSUM Linn.

Cynoglossum furcatum *Wall* & C. glochidiatum *Wall.* Vern. *Ja-Byrtheid* Kh. also occur in the area.

Onosma Emodi *Wall.*

A hispid herb. *Leaves* sessile 2-4 by ·5-1 in., lanceolate or hispid. *Flowers* in capitate cymes; pedicels ·3 in. long; sepals ·3 in. long, ovate-acuminate, hispid, spreading in fruit. *Corolla* purplish, ventricose, narrowed at the mouth, hairy, ·6 in. long. *Anthers* included; style exserted. *Nutlets* 4, tuberculate.
NAGA HILLS.

Lycopsis arvensis *Linn.*

An annual hispid herb. *Leaves* 2 by ·3 in., oblong-acute, (upper amplexicaul; lower petioled). *Flowers* small, usually white in bracte-

ate terminal racemes, (3-6 in. long in fruit). *Calyx-segments* 5, linear, ·16 in. long, oblong-linear, hispid, some what enlarged in fruit. *Corolla* tube curved in the middle, ·25 in. long, narrowly cylindric; lobes 5, imbricate, ·12 in. long. *Stamens* 5, spreading, attached near the base of the corolla tube. *Ovary* 4-lobed; style filiform; stigma capitate. *Nutlets* 4. *Carpophore* conical.

Trichodesma khasianum *Clarke.*

, A stout somewhat setose shrub. *Leaves* opposite, large, 7 by 2·5 in. long, elliptic, narrowed at both ends, scabrous, tuberculate above, sparsely hairy beneath. *Flowers* in many flowered (50-100) terminal corymbose racemes. *Calyx* segments 5, rusty pubescent, enlarged in fruit (1 by ·6 in.), papery, corolla tube ·3 in. long; lobes 5-3 in. losg. linear-lanceolate. *Stamens* 5, anthers elongate, connivent in a cone; cone about ·5 in. long, patently white, hairy. *Ovary* 4-celled. *F.* ' ellipsoid, sub-4-ridged. *Nutlets* ·25 in. long, widely margined.

KHASI HILLS.

Flrs. & Fr. Cold season.

FAM. 92. CONVOLVULACEÆ. (By C. B. Clarke.)

Herbs or shrubs, frequently twining, latex often present. *Leaves* mostly simple, palminerved, sometimes lobed, alternate, exstipulate, rarely leafless parasite (*Cuscuta*), some have tuberous roots, other rhizomes or tuberous stem. *Flowers* often showy, regular, hermaphrodite, hypogynous, usually 5-merous, solitary or cymose; bracts and bracteoles present. *Calyx* deeply partite, persistent, often enlarged in fruit; segments imbricate. *Corolla* of various shapes; limb lobed or angled, often plicate, induplicate valvate or convolute. *Stamens* epipetalous, usually on the base of the tube, alternate with petals; anthers usually introrse. *Disc* usually annular, entire or lobed or obsolete. *Ovary* superior (or rarely 3-5 carpels), cells as many as carpels or twice as many by false septa; ovules 2 in each carpel and more or less anatropous.

Fruit various, berry, capsule or nutlets. *Seeds* 4-1; albumen 0 or scanty; cotyledons usually foliaceous and plaited.

Non-parasitic green leafy herbs or shrubs usually twining:—
  Pollen grains spinulose:—
    Fruit indehiscent:—
      Stigmas 2 with linear oblong lobes and fruit breaking up irregularly .. .. **1. Rivea.**
      Stigmas with rounded lobes. Calyx-segments not enlarging in fruit:—
        Ovary 4-celled. Fruit dry or baccate. **2. Argyreia.**
        Ovary 2-celled. Fruit baccate. .. **3. Lettsomia.**
    Fruit usually dehiscent:—
      Corolla usually campanulate. calyx segments not aristate; stamens not exserted. .. .. .. **4. Ipomæa.**
    Corolla usually salver-shaped; calyx segments aristate; stamens epipetalous:—
      Flowers small, red, rather irregular. .. **5. Quamoclit.**
      Flowers large, white or purple, regular. **6. Calonyction.**
    Corolla small; lobes lanceolate; stamens arising from the backs of 5 scales attached to the base of the tube; fruit 4-valved. .. **7. Lepistemon.**
  Pollen grains not spinulose:—
    Fruit usually dehiscent:—
      Calyx segments much enlarged in fruit; bracts not enlarged in fruit, style entire or shortly 2-lobed. .. .. .. **8. Porana.**
      Calyx segments not or slightly accrescent in fruit:—
        Style entire; stigmas usually 2-lobed. .. **9. Hewittia.**
        Style usually partly united below, not branched above; stigma 2, capitate. .. **10. Breweria.**
Pollen grains not spinulose:—
  Fruit usually dehiscent:—
    Calyx segments not or slightly accrescent in fruit; style entire; ovary 2, sometimes nore celled:—
      Outer corolla segments larger than the inner and decurrent on the peduncle; stigma globose. .. .. .. **11. Aniseia.**
      Outer corolla segments not larger than the inner, not decurrent; stigma 2, globose:—
        Capsule 4-valved, stem not usually winged. .. .. **12. Merremia.**
        Capsule dehiscent circumsciss, stem winged and angled. .. .. **13. Operculina.**

Fruit indehiscent, woody or fleshy, rather large; style hardly any; corolla-lobes obcordate or emarginate; flowers yellowish white in panicles. .. .. **14. Erycibe.**

Parasitic leafless twiner, yellow and herbaceous; embryo slender, spiral. .. .. **15. Cuscuta.**

1. RIVEA Chois.

Erect or twining shrub. *Leaves* ovate-cordate, silky when young. *Flowers* in axillary few flowered panicled cymes, often supported by bracts. *Calyx* 5-fid; segments sub-equal. *Corolla* large, white, salver-shaped; tube narrow, obscurely lobed; lobes rounded, plicate. *Disc* annular. *Stamens* included. *Ovary* 4-celled with 4 ovules; style filiform; stigmas linear-oblong. *Fruit* sub-globose, nearly dry, indehiscent or breaking up irregularly. *Seeds* 1-4, glabrous in a mealy pulp.

Stout, usually erect shrubs:—
Peduncles 3-7 flowered. Leaves usually broader than long. Corolla usually white silky without. Calyx-segments lanceolate. *1. R. Ornata.*

Scandent shrub:—
Peduncles 1-3 flowered. Leaves usually not broader than long. Corolla usually glabrous without. Calyx segments ovate-obtuse. .. *2. R. hypocrateriformis.*

1. Rivea ornata *Chois.* Var. Griffithii Clarke=Rivea Roxburghii Prain. Vern. *Takaria-alu,* Ass.

An erect spreading shrub or undershrub with woody base and herbaceous stem; young parts densely silky, pubescent or villous, 3-6 in. across, orbicular or cordate or reniform, often apiculate, sometimes emerginate, bright silky beneath; lateral nerves 5-10 on either half; petiole 1·5-2 in. long. *Flowers* white, fragrant; peduncles stout, long, upto 5 in. long. *Calyx* segments ·5-·6 in. long, oblong or ovate-lanceolate, acute. *Fruit* reddish brown, 1-celled.

KHASI HILLS (4,500 ft.).

Flrs. 9. Fr. 12.

2. Rivea hypocrateriformis *Chois.*

A twining climber; young parts villous. *Leaves* 1-4 in. long, orbicular, cordate, rarely broader than long, adpressed, silky beneath; lateral nerves about 6 on either half; petiole upto 2 in. long. *Calyx-segments* ·3 in. long, ovate-elliptic, obtuse. *Fruit* globose, ·5 in., in diameter. *Seeds* 1-4.

ASSAM (Griffith).

Flrs. 9. Fr. Cold season.

2. ARGYREIA Lour.

Climbing shrubs, rarely erect. *Leaves* ovate-cordate to lanceolate, usually silky hirsute or pubescent beneath. *Flowers* showy, in axillary corymbose or capitate cymes; bracts usually conspicuous. *Calyx* 5-fid; segments equal or unequal, sometimes a little accrescent in fruit. *Corolla* tubular, funnel-shaped, 5-angled or lobed; limb plicate. *Stamens* 5, included; filaments often thickened at base; anthers oblong, straight. *Disc* annular. *Ovary* 4-celled, 4-ovuled; style filiform; stigmas 2, globose. *Fruit* baccate, dry or fleshy. *Seeds* 1-4, embedded in mealy pulp.

Bracts persistent:—	
Peduncles 1 in. long or less. Flowers campanulate. Leaves densely grey tomentose beneath.	1. *A. nervosa.*
Bracts caducous or deciduous:—	
Leaves usually cordate, glabrous above, white tomentose beneath:—	
Corolla silky externally on the folds not white tomentose beneath (glabrescent or somewhat hairy).	2. *A. speciosa.*
Corolla tube glabrescent, limb sparsely hairy.	3. *A. Hookeri.*
Corolla sparsely hairy externally on the folds. Leaves sparsely hairy above, adpressed silky beneath.	4. *A. argentea.*
Corolla densely silky on the buds. Leaves softly and sparsely hairy on both surfaces; bracts semi-persistent, semi-foliaceous. ..	5. *A. Roxburghii.*
Leaves elliptic-oblong, acuminate or acute, glabrous above, softly silky white beneath:—	
Corolla sparsely hairy on the folds externally.	6. *A. splendens.*

1. Argyreia nervosa (*Burm. f.*) *Boj*=**A. Wallichii** Choisy. Vern. *Jatap-masi*, Kh.; *Jomang-pi-danok-soh-ring-kang*, Mik.

A large climber. *Leaves* 4·5-7 by 3·5·5 in., ovate or sub-orbicular, cordate, acute, chartaceous, glabrous above, densely grey tomentose beneath; lateral nerves about 8 on either half; petiole 2-4·5 in. long. *Flowers* in axillary capitate cymes; peduncles 1 in. or less. *Calyx* segments 2-3 in., elliptic-oblong. *Corolla* white, tinged with light rose, about 2 in. long, 1·25 in. broad at tip; lobes scanty, distinct.

KHASI HILLS.
Leaves are used as vegetable.
Flrs. 10.

2. Argyreia speciosa *Sweet.*

An extreme woody climber; branches and young shoots densely white tomentose. *Leaves* 4-12 in. across, ovate or bi-cordate, acute, quite glabrous above, persistently white tomentose beneath; lateral nerves 12-15 on either half, some are quite close to the base; petiole 2-9 in. long, stout, white tomentose. *Flowers* in long peduncled corymbose cymes; bracts deciduous, large, foliaceous, ovate-lanceolate, acute or acuminate. *Calyx* white, tomentose outside; segments oblong-elliptic, obtuse, leatherly (·5 by ·25 in.) in fruit. *Corolla* 2-2·5 in. long, white silky, pubescent outside, purplish, glabrous inside. *Fruit* about 1 in. in diameter, depressed apiculate, yellow inside; cotyledons intricately plaited.

KHASI HILLS, plain districts.

Flrs. Rainy season. Fr. Cold season.

3. Argyreia Hookeri *Clarke.* Vern. *Tille-kumou-blang*, Synt.

A large climber, old leaves yellow; young shoots silky. *Leaves* 4-8 by 2-5·5 in., orbicular, cordate, blunt, membranous, puberulous above, pubescent beneath; lateral nerves 9-10 on either half, 3 pairs from near the base; petiole 2·5-7 in.

long. *Flowers* in dichotomous corymbose few-flowered cymes; peduncles 2-12 in.; bracts caducous. *Calyx* segments ovate-acute, grey canescent, ·3 in. long, accrescent in fruit. *Corolla* rosy, tubular-infundibuliform, 2-2·5 in. long. *Fruit* depressed globose, bright orange, 4-celled, 4-seeded. *Seeds* globose white.

KHASI HILLS.

Flrs. Rainy season. Fr. Cold season.

4. Argyreia argentea *Chois.* Vern. *Bish-dharak,* Beng.

A large climber. *Leaves* 3-5 by 2-6·5 in., ovate-cordate, obtuse, acute, membranous, sparsely hairy above, densely adpressed silky beneath, sub-coriaceous; petiole 2-4·5 in. long. *Flowers* in dense peduncled corymbose cymes; bracts inconspicuous. *Corolla* 2 in., sparsely hairy on the folds outside. *Fruit* obscurely 4-lobed, fleshy orange about the seeds.

CACHAR, DARRANG, KAMRUP.

Leaves are tied on ring sores to dry and cure them.

Flrs. Rainy season. Fr. Cold season.

5. Argyreia Roxburghii *Chois.*

A large climber. *Leaves* broader than long, ovate-cordate, obtuse or notched, subcoriaceous, softly villous on both sides; lateral nerves about 8 on either half, prominent beneath; base shallow cordate; petiole 1·5-3 in. long. *Flowers* in axillary dense subcapitate cymes; peduncles long; bracts often large, leaflike, semi-persistent. *Calyx* elliptic-lanceolate, villous. *Corolla* tube 2·7 in. long, purplish, sparsely hairy externally.

KHASI HILLS.

Flrs. 8. Fr. 11.

6. Argyreia splendens *Sweet.* Vern. *Doukha-kaphuti,* Kach.; *Biang-han,* Mik.; *Khangiana-ria,* Naga; *Soh-laigur-biding-doukha,* Kach.

A large climber. *Leaves* 2·5-8 by 1-5 in., elliptic-oblong or ovate-elliptic, acute or acuminate, sub-coriaceous, glabrous

above, softly adpressed silky beneath; lateral nerves 13-17 on either half, prominent, sub-parallel; base rhomboid or rounded; petiole 2-4·5 in. long. *Flowers* white with blue centre, in lax corymbose cymes; peduncles 1-4 in. long; bracts small, caducous. *Calyx* segments ovate-acute, pilose, coriaceous, hard and dark-red in fruit. *Corolla* sparsely hairy on the folds outside. *Fruit* globose or orbicular, ·5 in. in diameter, 3-seeded.

NOWGONG, SIBSAGAR, N. C. HILLS, NAGA HILLS, KHASI HILLS.

Goats are fond of the leaves.

Flrs. 4-5. Fr. Cold season.

3. LETTSOMIA Roxb.

Climbing shrubs, more or less hairy. *Leaves* cordate or rounded at the base. *Flowers* in axillary dense peduncled cymes. *Calyx* segments 5, somewhat accrescent in fruit. *Corolla* funnel-shaped; limb plicate. *Stamens* 5, included or exserted; pollen grains spinulose. *Disc* annular. *Ovary* 2-celled, 4-ovuled; style filiform; stigma of 2 round lobes. *Fruit* baccate, indehiscent. Seeds 1-4, embedded in mealy pulp.

Fruit usually 2-4 seeded:—	
Corolla 1 in. long or more. Stamens included:—	
Bracts persistent, broad, 1 in. long or shorter:—	
Calyx segments smaller than the bracts; bracts 1 in. long.	1. *L. strigosa.*
Calyx segments longer than the bracts; bracts ·3-·5 in. long.	2. *L. barbigera.*
Bracts persistent, lanceolate or linear, longer than 1 in.:—	
Leaves 4-6 in. long; petiole 1-6 in. long.	3. *L. Mastersii.*
Leaves 6-8 in. long; petiole ·5-·8 in. long.	4. *L. longifolia.*
Bracts deciduous or one of the outer sometimes leaf-like; stem closely strigose. Corolla 2·5-3 in.; petiole 2-5 in. long. ..	5. *L. sikkimensis.*
Bracts caducous; stem softly hairy. Corolla 1·5-2 in.; petiole 2-3 in. long. ..	6. *L. rubens.*

L. barbigera Clarke; *L. sikkimensis* Clarke; *L. rubens* Clarke; *L. Mastersii* Prain; *L. longifolia* Coll, which are

recorded from the region of the flora are not described in details as they are not of great importance from forest point of view.

1. Lettsomia strigosa *Roxb.*

A large stout climber with milky-juice, brownish-hairy. *Leaves* 3-5 by 2·5-4·5 in., broadly ovate-cordate, acuminate, rather coriaceous, densely hairy with patent hairs on both surfaces; lateral nerves 16-19 on either half at an angle of 60°-90° with the midrib; petiole 1-5·5 in. long. *Flowers* light rosy in long peduncled capitate cymes; peduncles 3-5 in.; bracts elliptic-oblong, persistent, hairy. *Calyx* segments densely hirsute with patent hairs. *Stamens* included; anthers oblong, not twisted; filaments hairy at base; stigma globose. *Fruit* ·25 in., 2-4-seeded.

CACHAR, SYLHET, DARRANG, KHASI HILLS.
Flrs. 10-12. Fr. 2-3.

4. IPOMÆA Linn.

Twining or prostrate herb or shrubs, rarely erect. *Leaves* alternate, simple entire or lobed, cordate, sometimes palmately compound. *Flowers* often showy, axillary, solitary or in cymes. *Calyx* segments 5, equal or unequal, often accrescent in fruit. *Corolla* campanulate or funnel-shaped, entire or slightly lobed; limb plicate. *Stamens* 5, included; anthers straight or twisted; filaments often unequal, hairy or dilated at the base, smooth or bearded, pollen grains spinulose. *Ovary* usually 2-celled, rarely 4; ovules 4; stigma lobes 2, globose. *Capsule* usually 4-valved. *Seeds* usually 4; cotyledons crumpled, often 2-lobed.

Ovary 3-celled, 6-ovuled:—
  Corolla tube narrow:—
    Leaves 3-lobed .. .. .. 1. *I. hederacea.*
    Leaves entire. .. .. .. 2. *I. purpurea.*
Ovary 4-celled:—
  Corolla widely funnel-shaped:—
    Leaves palmately and deeply 5-7 lobed, scandent. .. .. .. 3. *I. digitata.*
    Leaves triangular, ovate, angled or sharply lobed, prostrate (sweet potatoes). .. 4. *I. Batatas.*

Ovary 2-celled:—
Sepals green, heraceous, equal or nearly so:—
Flowers capitate, pinkish:—
Heads sessile or sub-sessile; bracts ovate, linear. .. .. 5. *I. hispida.*
Heads long peduncled; bracts large, boat-shaped, including the head. .. .. 6. *I. involucrata.*
Flowers pedicelled:—
Leaves not deeply or palmately lobed, or only 2-3 lobed:—
Sepals sub-equal, ovate-obtuse. Leaves hastate, triangular or lanceolate, creeping prostrate or floating aquatic .. 7. *I. reptans.*
Sepals equal, orbicular. Leaves ovate or ovate deltoid, shrubby subscandent littoral. .. .. .. 8. *I. staphylina.*
Sepal oblong-elliptic. Leaves ovate or orbicular, cordate, entire. A large climber. .. .. .. 9. *I. Gomezii.*
Leaves deeply 5-7-lobed or palmately compound:—
Sepals glabrous. Corolla purplish. .. 10. *I. cairica.*

1. Ipomæa hederacea *Jacq.*

An extensive twining annual; stem hirsute. *Leaves* 2·5-4·5 by 1·8-3 in., broadly ovate-cordate, acuminate, 3-angled or more or less deeply lobed, less often entire, lobes acuminate, sparsely pubescent above, more densely beneath; petiole 2-4 in. long. *Flowers* blue or purple, tubular, funnel-shaped, up to 2·5 in. long, about 1·5 in. across, 1-5 together on long peduncles. *Calyx* segments ligulate acuminate; filaments woolly at the base; anthers sagittate (not twisted). *Ovary* 3-celled, 6-ovuled. *Capsule* ·4 in. across. *Seeds* 4 or 6.

KHASI HILLS, Shillong (cultivated or escapes in hedges). The seeds are used as purgative.

Flrs. & Fr. 6-2.

2. Ipomæa purpurea *Lamk.* Morning glory.

Climber with retrorse hairs. *Leaves* 2·5-4 in., orbicular, ovate-cordate, entire, membranous; petiole 1·5-3 in. long. *Flowers* purplish to white, umbelled in apex of a peduncle which is longer than the petiole, each pedicel supported by 3 subulate bracts. *Calyx* segments short, acuminate, or un-

equal widths with spreading hairs at base. *Ovary* 3-celled. *Seeds* usually 6, glabrous.

Cultivated; apparently wild in KHASI HILLS (Barpani).

Flrs. 10. Fr. Cold season.

3. Ipomæa digitata *Linn.*=**1. paniculata** Br..

An extreme climber; stem glabrous. *Leaves* 3-6·5 in. in diameter, sub-orbicular, palmately 5-7 lobed; lobes acuminate; base cordate; petiole 1·5-5 in. long. *Flowers* in pedunculate corymbose cymes. *Corolla* pink-purple, wide-campanulate, 1·5-2·5 in. long. *Calyx* segments accrescent in fruit. *Ovary* 4-celled, 4-valved. *Seeds* hairy or woolly.

KHASI HILLS, SIBSAGAR.

Flrs. 7-8. Fr. Cold season.

Ipomæa Learii *Paxt.*

A large hirsute perennial twiner. *Leaves* ovate-cordate, entire or slightly lobed, acute, sparsely hirsute above, more so beneath. *Flowers* blue in 3-7 flowered, congested pedunculate cymes, often 1 bract, foliaceous. *Corolla* 2·5-3 in. long, glabrous outside.

Gauhati A TROPICAL AMERICAN species, cultivated.

Flrs. 7. Fr. later.

4. Ipomæa Batatas *Lamk.* Vern. *Shakar-kand-alu, Mitha-alu,* Beng. & Hind.; *Sa-lah,* Synt. The sweet potato.

A prostrate annual trailing on the ground, with milky-juice. *Leaves* 1-3·5 by ·8-2·5 in., ovate-cordate more or less lobed; petiole up to 3 in. long. *Flowers* purple, 2 in. long.

Cultivated throughout the Province for the sake of the tubers of which there are 2 varieties (not white).

5. Ipomæa hispida *Roem.*=**1. eriocarpa** R. Br.

Wing trailing herb. *Leaves* 1·5-2 by ·2-·8 in., lanceolate. triangular or ovate, acuminate or acute, cordate; petiole 1-1·5 in. long. *Flowers* rosy ·3-·5 in. long and across, in sessile or almost sessile capitate cymes. *Calyx* segments not enlarged in fruit. *Corolla* ·6-·75 in. across, stigma rounded,

scarcely lobed. *Capsule* globose, hairy, 2-celled, 4-seeded. *Seeds* puberulous or glabrous, pitted.

K. & J. HILLS.

Flrs. 10. Fr. Cold season.

6. Ipomæa involucrata *Beauv.*=**I. pileata** Roxb.

A slender wing annual, twining or trailing; stem hairy. *Leaves* 2-5 by 1-3 in., orbicular, ovate-acuminate; petiole 1-3·5 in. long. *Flowers* light purple, about ·1 in. long, capitate, long peduncled, enclosed in a perfoliate boat-shaped involucre consisting of connate bracts. *Calyx* segments unequal. *Corolla* tube ·75 in. long, ·1 in. in diameter; stigma 2-lobed, pink. *Fruit* globose, 4-seeded, pericarp many.

K. & J. HILLS.

Flrs. & Fr. 10.

7. Ipomæa reptans *Poir.* Syn. **I. aquatica** *Forsk.* Vern. *Kalmi*, Beng.

A glabrous aquatic herb with milky-juice; stem floating or trailing, rooting at the nodes. *Leaves* hastate or cordate, entire or more or less angularly lobed. *Flowers* pale, rosy, 2 in. long.

Common in the plains districts, in ponds or low lying swampy localities.

The leaves and under-shoots are eaten as vegetable.

Flrs. & Fr. Rainy season, probably throughout the year.

8. Ipomæa staphylina *Roem. & Sch.*=**I. racemosa** Roth.

A glabrous large scandent shrub. *Leaves* 2-5 by 1-3 in., ovate, sub-acute, rather thick, glabrous, dull green above and beneath, sub-cordate at base; lateral nerves prominent, 8-10 on either half; petiole 1-2·5 in. long. *Flowers* numerous in panicles which are usually larger than the leaves; bracts small, caducous; pedicels ·1-·3 in. long. *Calyx* segments ·2 in. long, glabrous. *Corolla* white, slight tinged, purplish, about 1 in. long, narrowly campanulate. *Capsule* ovoid,

sub-acute, ·3 in. long, 4-seeded. *Seeds* clothed with long silky hairs.

ASSAM (Jenkins).

Flrs. 11-12. Fr. Hot season.

I. obscura and I. polyantha. Var. affinis are also recorded from the region of the flora by G. Mann.

9. Ipomæa Gomezii *Clarke.*

A large climber. *Leaves* 3-6 in. long, ovate-orbicular, cordate, entire, acute, glabrous; petiole about ·2 in. long; flowers very large, corymbose; peduncles short, 2-3 in. long; pedicels stout, about 4 in. long. *Calyx* accrescent in fruit; segments · oblong-elliptic 1·25-1·75 by ·8-1 in. *Corolla* campanulate. *Fruit* globose, brownish, ·4 in. in diameter, supported by a ring of long golden brown hairs at the base.

LAKHIMPUR (Dulongmukh).

Flrs. 3. Fr. Rainy season.

10. Ipomæa cairica *Sweet*=**Ipomæa palmata** *Forsk.* =**1. pulchella** Roth. Vern. *Khom-chili-rang*, Kuki.

An exclusive climber. *Leaves* 1-4 in. in diameter, usually subpedately 7-lobed, membranous, glabrous; petiole ·6-2 in. long. *Flowers* purplish; peduncles usually 3-flowered, shorter than the petiole. *Calyx* segments glabrous, acute. *Corolla* purplish white outside, deep purple inside, narrow campanulate. *Stamens* of unequal length. *Capsule* ovoid, ·4 in., 2-celled, 4-seeded. *Seeds* hairy.

N. C. HILLS. Doubtfully indigenous.

Flrs. 5.

5. QUAMOCLIT Chois.

Flowers in axillary long peduncled few-flowered cymes. *Calyx* segments 5, aristate. *Corolla* salver-shaped, slightly irregular; tube slender, slightly funnel-shaped. *Stamens* 5, exserted; filaments unequal. *Ovary* glabrous, 4-celled,

4-ovuled; stigma 2, globose. *Capsule* 4-celled, 1-valved. *Seeds* 4, black.

Leaves ovate-cordate. Calyx segments acuminate. Seeds pubescent.	1.	*Q. phœnicea.*
Leaves deeply pinnate; segments filiform. Calyx segment elliptic. Seeds almost glabrous.	2.	*Q. pennata.*

1. Quamoclit phœnicea *Choisy*. Syn. **Ipomæa coccinea** Cl.

A herbaceous climber. *Leaves* 1·5-3 in. long, ovate-cordate, sometimes acutely lobed. *Corolla* large, salver-shaped, about 1·5 in. long, red or orange. *Seeds* pubescent.

Cultivated. Dhubri.

Flrs. Rainy season. Fr. Cold season.

2. Quamoclit pennata *Boj*. Syn. **Ipomæa Quamoclit,** *Linn. Tarulata,* Sans.

A graceful slender climber. *Leaves* pinnate-partite; segments filiform. *Corolla* salver-shaped, bright red or white. *Seeds* almost glabrous.

Cultivated. Silchar.

Flrs. & Fr. Rainy season.

6. CALONYCTION Chois.

Flowers solitary or in few-flowered axillary cymes. *Calyx* segments 5, sub-equal or outer smaller sometimes aristate. *Corolla* large, salver-shaped; tube long, slender; limb plaited. *Stamens* exserted, sometimes quite slightly or almost included; stigma lobes 2, rounded. *Ovary* 2-celled, 4-ovuled. *Fruit* often developing false partitions.

Flowers white:—		
Pedicels not usually thickened under the fruit:—		
Seeds villous with shaggy margins. Calyx segments ovate or orbicular, accrescent in fruit.	1.	*C. comorensis.*
Seeds yellow:—		
Calyx segments unaltered or slightly enlarged in fruit.	2.	*C. bona-nox.*

Flowers purple:—
Pedicels greatly thickened under the fruit:—
Seeds black:—
Calyx segments ending in a long cusp or acumen, keeled. .. .. .. 3. *C. muricatum.*

1. Calonyction comorensis *Bojer.* Syn. **I. grandiflora** Lamk. **I. glaberrima** Bojer.

A large twiner in swampy locality on reeds; stem muricate and obscurely fluted. *Leaves* 2·5-4·5 by 1·8-3 in., broadly cordate, often irregularly lobed; basal nerves about 7; petiole 2-4 in. long. *Flower* buds ovoid. *Calyx* segments thick, every sharply margined, ovate or orbicular, accrescent in fruit. *Corolla* funnel-shaped, tube about ·3 in. in diameter; filaments 1·5-2 in. long, tapering, hairy in the lower half; style slender. *Seeds* villous, margins shaggy.

KHASI HILLS.

Flrs. & Fr. Cold season.

2. Calonyction bona-nox *Boj.* Syn. **Ipomæa Bona-nox** Linn. Var. **glandiflorum** *Chois.* Moon flower. Vern. *Phan-soh-kari-khnai,* Khasi.

A large glabrous climber. *Leaves* 4-7 by 3·5-5 in., ovate-orbicular, cordate, finely acuminate, rather membranous, glabrous. *Flowers* white, 3-5 in. across, axillary; peduncles 1-5 flowered; pedicels 2·5-3 in. *Calyx* segments aristate. *Corolla* tube cylindrical, about 4 by ·2-·25 in., lobes spreading; anthers pubescent, about 1 in., lanceolate. *Capsule* about 1 in. long. *Seeds* yellow.

KHASI HILLS, NOWGONG.

Flrs. 10. Fr. 12.

3. Calonyction muricatum *G. Don.* Syn. **Ipomæa muricata** Jacq.

A twiner, usually with muricate stem. *Leaves* 2·5-6 in., braodly ovate, entire, glabrous. *Flowers* purplish; peduncles 1-5-flowered; pedicels extraordinarily thickened under the fruit. *Calyx* segments tapering about 5. *Corolla* 2-3 in.

long; capsule ·5 in. across, globose, spiculate. *Seeds* smooth, black.

MANIPUR.

Flrs. Rainy season. Fr. Cold season.

7. LEPISTEMON Blume.

Lepistemon Wallichii *Chois.*

A stout scandent shrub; stem villous. *Leaves* 2-4·5 by 1·5-3 in., ovate-acute, entire or often 3-lobed, hirsute, cordate; petiole 1-3 in. long, cymes axillary, 5 to 30 flowered; peduncles usually short; pedicels ·5 in. *Calyx* teeth ·3 in., hirsute, lanceolate-acuminate. *Corolla* ·5-·6 in. long, yellowish-white ·2 in. across, tubular; tube hairy outside, dilated at base, mouth funnel-shaped; filaments short, dilated at the base into 5 concave scales conniving over the ovary at the base, glabrous above, basal process papillose. *Disc* large, cupular. *Ovary* 2-celled, 2-ovule in each cell; style very short; stigma bipartite. *Capsule* ·25 in., ovoid, glabrous, 4-valved. *Seeds* glabrous.

CACHAR, MANIPUR, KHASI HILLS upto 4,000 ft.

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

8. PORANA Burm.

Scrambling or twining shrub. *Leaves* ovate, usually entire, petiolate. *Flowers* in axillary cymes, racemose or copiously paniculate; bracts persistent. *Calyx* segments 5, small, equal in flowers, accrescent in fruit developing into large ribbed and veined wings. *Corolla* campanulate or funnel-shaped; limb plicate, sub-entire or lobed. *Stamens* sub-included; filaments slender; anthers not spinulose. *Ovary* 2-celled or 1-celled; ovules 2-4; style slender; stigma solitary, 2-lobed or 2-capitate. *Fruit* globose, 1-seeded, membranous, indehiscent or opening by 2-valves. *Seeds* glabrous; cotyledons plicate.

Flowers large, about 1 in. long:—
3 calyx-segments developing into veined wings in fruit, tomentose. Leaves velvety on both sides. .. .. 1. *P. spectabilis.*

Flowers small, ·25-·5 in. long :—
All calyx-segments enlarged in fruit and equal:—
Fruiting segments ·3-·5 by ·12 in.; capsule ellipsoid, ·2 in. .. .. .. 2. *P. racemosa.*
Fruiting segments ·6 by ·3 in., capsule obconic, truncate, ·3 in. .. .. 3 *P. truncata.*
3 calyx-segments greatly enlarged in fruit, pubescent, reticulate. .. .. .. 4. *P. paniculata.*

1. Porana spectabilis *Kurz.*

A large climbing shrub, tawny, tomentose. *Leaves* 2-5 by 1·8-3 in., ovate-oblong or ovate (rarely suborbicular), acute or subobtuse, mucronate, subcoriaceous, puberulous above, pubescent or woolly beneath; petiole up to 1 in. *Flowers* white, in long axillary racemes. *Calyx* segments about ·5 in., linear-oblong, tawny tomentose. *Corolla* funnel-shapd, 1-5 in. long; style as long as corolla tube; stigma capitate. *Capsule* ·2 in. across, sub-globose.

NAGA HILLS, LUSHAI HILLS.

Flrs. 11-12 Fr. 3-6.

2. Porana racemosa *Roxb.*

A slender deciduous climber often trailing; stem pinkish, pubescent, old leaves copper-coloured. *Leaves* 2-4·5 by 1·3-3 in., ovate-acuminate, broadly cordate, membranous, sparsely puberulous above, glabrous beneath, usually 5-basal nerved; petiole ·5-2 in. long. *Flowers* white, in axillary and terminal dichotomous compound racemes; bracts persistent, ovate, deeply cordate, short, acuminate, sessile, light pinkish, about 1 by ·2-·6 in., all calyx-segments accrescent in fruit, equal, narrowly oblanceolate, mucronate, green at base, reddish brown above, ·3-·5 by ·12 in. *Corolla* about 1 in., cleft more than half the length; lobes longer than the tube. *Capsule* ·2 by ·1 in., crowned with remains of style, green, glabrous, slightly tapering, nodding on slender pubescent pedicels ·25 in. long.

KHASI HILLS (5,800 ft.).

Flrs. 9-11. Fr. Cold season.

3. Porana truncata *Kurz.*

A slender climbing shrub, almost glabrous. *Leaves* 1·5-4 by 1-2·5 in., ovate or suborbicular, entire or distantly shallow, angled, acuminate, membranous, glabrous, usually 5-basal nerved; base cordate; petiole up to 4 in. long. *Flowers* in dichotomous compound racemose cymes; bracts foliaceous, cordate, persistent. *Flowers* not seen. *Capsule* ·25 in., obconoid, truncate. *Fruiting* calyx-segments equal, elliptic, ·6 in. long, narrowed at both ends, 5-7-nerved from the base.

(No specimen in Forest Herbarium, Shillong).
KHASI HILLS (Mairang 16,602 C. B. Clarke).
Fr. 10.

4. Porana paniculata *Roxb.* Vern. *Rikamir,* Miri. The bridal creeper.

An extensive dextrorse woody climber. *Bark* rough, light brown; branchlets and inflorescence grey tomentose; blaze whitish, turning brown. *Leaves* variable, usually 1-5 by ·6-4 in., smaller towards the inflorescence, ovate-cordate, acuminate, entire, membranous, pubescent, 5-7-basal nerved; petiole ·5-3 in. *Flowers* white, faintly sweet-scented, ·15-·25 in. long, in terminal and axillary lax panicles; bracts foliaceous; bracteoles subulate, ·3 in. *Calyx* segments greatly enlarged into veined wing in fruit, pubescent, reticulate. *Capsule* thin, fragrant, pubescent outside, shortly apiculate, about ·2-·3 in. long.

Common throughout the Province.
Twigs are suitable for making coarse baskets.
Flrs. 10-12. Fr. 1-3.

9. HEWITTIA W. & A.

Hewittia bicolor *Wight.*

A pubescent perennial slender climber generally trailing. *Leaves* 2-5 in. across, cordate-ovate, sometimes somewhat lobed or angled, acuminate or acute, membranous, puberulous on both sides; petiole ·6-1·8 in. long. *Flowers* 1·5 in. across, light pale-dun with dark purplish brown centre in axillary cymes, sometimes solitary. *Calyx* segments foliace-

ous, unequal. *Corolla* hairy without, shortly 5-lobed. *Stamens* included; filaments subulate, dilated at the base; bract purpule. *Ovary* villous. *Fruit* capsular, 4-valved, 2-3-seeded. *Seeds* glabrous.

N. C. HILLS (not common).

Flrs. 5. Fr. Cold season.

10. BREWERIA R. Br.

Breweria cordata *Blume.*

A large twining shrub, rusty tomentose. *Leaves* 2-3 by 1·5-2·5 in., ovate, acute or acuminate, entire, rusty tomentose or villous; lateral nerves rather obscure; base cordate; petiole 1-2 in. long; peduncles 1-2·5 in. long, 2-5-flowered; bracts ·2-·3 in., oblong; cymes rusty-tomentose. *Calyx* segments ·3-·5 in. long, ovate-oblong. *Corolla* white, funnel-shaped, 1·5 in. long, hairy without; limb plaited. *Stamens* included; style 2, united partially at the base; stigma capitate. *Capsule* sub-globose, glabrous, ·5 in. long. *Seeds* almost glabrous.

SYLHET.

Flrs. 10-11. Fr. 2.

11. ANISEIA Choisy.

Aniseia martinicensis (Jacq.) *Choisy*=A. uniflora Choisy=Ipomæa uniflora Roem. & Sch.

A slender creeper or climber. *Leaves* ·8-3 by ·5-1 in., ovate or oblong, often mucronate; petiole ·3-·5 in. long. *Flowers* solitary, axillary. *Calyx* segments 5, unequal, herbaceous, outer 3 larger, decurrent, accrescent in fruit. *Corolla* widely campanulate, white, pubescent outside. *Stamens* 5, included; filaments filiform; anthers not spinulose. *Ovary* 2-celled; style filiform; stigma 2, globose; ovules 4. *Capsule* 4-valved, ovoid, ·5 in. long. *Seeds* 4, black, smooth.

LAKHIMPUR (Gage).

Flrs. & Fr. 10-12.

12. MERREMIA Dennst.

Climbing, rarely prostrate herbs or shrubs. *Leaves* alternate, entire, lobed or divided. *Flowers* axillary, solitary or in few flowered cymes; peduncles long; bracts small. *Calyx*-segments 5, sub-equal. *Corolla* campanulate or funnel-shaped, usually white, sometimes yellow or orange; the tube with 5 vertical bands marked by 5 dark violet lines; limb plicate, slightly 5-lobed. *Stamens* 5, unequal, included or exserted; filaments filiform; anthers usually twisted, pollen not spinulose. *Ovary* 2-4-celled; ovules 4; style filiform; stigma 2, globose. *Capsule* 4-valved, 1-4, tubular, sometimes the style separating with a small stipule. *Seeds* 4, dull, glabrous, rarely puberulous; cotyledons crumpled.

Corolla more or less hairy outside :—
  Seeds with spreading hairs :—
    Corolla villous at the apex :—
      Cymes subumbellate. .. .. 1. *M. umbellata.*
Corolla glabrous outside :—
  Buds conical, long, acute :—
    Corolla more than 1 in. long :—
      Leaves 5-7 lobed, vein-like :—
        Corolla yellow. .. .. .. 2. *M. vitifolia.*
    Corolla less than 1 in. long :—
      Calyx-segments glabrous, obtuse :—
        Leaves petioled :—
          Peduncles 3, many flowered. .. 3. *M. cæspitosa.*
  Buds short, globose, obtuse :—
      Calyx-segments glabrous, truncate and cucullate :—
        Peduncles 3-7 flowered. .. 4. *M. chryseides.*

1. Merremia umbellata *Hallier f.*=Ipomæa cymosa Roem. & Sch. Vern. *Bongki-ripuk,* Miri; *Appa-taru,* Duff.; *Turnaisa,* Kach.; *Sithri-bodu,* Garo; *Goria-loti, Kolia-lota,* Ass.; *Mokhamsra-dukha,* Kach.

An extremely variable scandent perennial, somewhat angular, sometimes rooting at the nodes, hairy or glabrous, pubescent when young. *Leaves* 1·5-2·5 by ·5-1·5 in., ovate, oblong-lanceolate or elliptic-acuminate, acute or obtuse, entire, angular or toothed, usually pubescent on both surfaces when young on the nerves beneath; lateral nerves prominent, about 4 on either half, sub-parallel; base rounded, cordate

or hastate; petiole ·3-·8 in. long, pubescent. *Flowers* in axillary subumbellate cymes. *Calyx* segments ·3-·35 in., elliptic-obtuse, aristate. *Corolla* white or with a cream-coloured yellow tinge, about 1-1·25 in. long, pubescent near the apex; tubular, funnel-shaped, slightly lobed. *Capsule* globose, glabrous, ·3 in. in diameter. *Seeds* densely clothed with blackish hairs.

GARO HILLS, N. C. HILLS, NOWGONG, KAMRUP, DARRANG, SIBSAGAR.

Leaves are used as vegetable and also for poultice.
The climber is tied round the waist to relieve pain.

Flrs. 2-4. Fr. 5-8.

No. 3642 identified at Sibpur I. cymosa is probably I. Kingii= I. cymosa. Var. macra.

Flowers and the leaves are much larger.

2. Merremia vitifolia *Hallier f.*=Ipomæa vitifolia *Sweet. Vern. Digi-lewa,* Mech; *Toskrai-rikang,* Mik.; *Gajaudi-doukha,* Kach.; *Dijaobideng,* Cach.; *Parnemrang,* Kuki; *Dukhumi-bidu,* Garo.

An extensive twiner, hairy, scarcely woolly. *Leaves* 2-7 in. in diameter, suborbicular or broadly ovate (veins like) usually palmately lobed 5-7, deeply cordate; lobes acute or acuminate, strong, toothed, more hairy above than beneath; petiole ·5-4 in. long. *Cymes* 1-7-flowered, pedunculate hairy. *Calyx* segments hairy, 2-7·5 in., accrescent in fruit. *Corolla* pale yellow or purplish, 1·5-2 in. long, glabrous; filaments short. *Capsule* globose, ·5 in. in diameter, usually 4-seeded. *Seeds* blackish.

GOALPARA, GARO HILLS, N. C. HILLS, KHASI HILLS.

Flrs. 1-3. Fr. Rainy season.

Merremia hastata *Hallier f.*=Ipomæa angustifolia Jacq.

Diffuse wiry climber. *Leaves* sessile or shortly petioled, 1·5-3 by ·3-·75 in., hastate, acuminate membranous, basal lobes often toothed, the rest entire. *Flowers* in cluster of 1-3; peduncles slender, 1·5-3 in. long. *Calyx* segments ovate-lanceolate, fairly acuminate, almost equal. *Corolla* funnel-shaped, pale-yellow with a purplish eye, ·75-1 in. long; filaments glabrous, tapering; stigma very large, green. *Fruit*

globose, ·2 in. in diameter, obscurely 4-gonous. *Seeds* 4, with large circular hilum, dark brown; testa veined.

K. & J. HILLS.
Haines says flowers from May onwards.
Flrs. & Fr. Cold season.

3. Merremia cæspitosa *Hallier f.*=Ipomæa linifolia Blume.

A slender creeper or twiner. *Leaves* 1-2·5 by ·25-·9 in., linear-oblong, lower. ovate-oblong, subcordate, somewhat hastate; petiole ·25-·8 in. long. *Flowers* in 3-many flowered axillary cymes; peduncles slender, 1-3 in. long. *Calyx*-segments obtuse, ·25 in. long. *Corolla* upto ·75 in. long. *Capsule* ovoid, ·3 in. long.

KHASI HILLS, MANIPUR, SIBSAGAR.
Flrs. 10-12. Fr. 2.

4. Merremia chryseides *Hallier f.*=Ipomæa chryseides Ker-Gawal.

A slender twiner, glabrous, often with small prominence. sometimes slightly hairy at the nodes. *Leaves* usually 1-3 by ·5-2 in., ovate-cordate, acute, entire or toothed or shallowly 3-lobed; petiole ·7-1·5 in. long. *Flowers* in axillary long pedunculate few flowered cymes. *Corolla* yellow, campanulate, 5-lobed. *Capsule* ·25 in. long, somewhat 4-angled, broadly ovoid, transversely wrinkled. *Seeds* pubescent, minutely dotted.

CACHAR (42,412 Clarke).
Flrs. & Fr. Cold season.

13. OPERCULINA Manso.

Operculina Turpethum *Manso*=Ipomæa Turpethum R. Br.

A large herbaceous perennial climber scarcely woody, with milky juice; stem much twisted, softly pubescent, angled, 3-4 winged. *Leaves* usually 2-5 by 1-3 in., upper ones often longer, ovate or oblong, obtuse or subacute, sometimes mucro-

nate, more or less pubescent on both surfaces; lateral nerves 9-12 on either half; base cordate or truncate; petiole 1-3 in. long, pubescent, often winged. *Flowers* large, axillary in few flowered cymes; bracts about 1 in. long, pinkish, deciduous; pedicels thickened in fruit. *Calyx* segments 5, unequal, ovate; outer ones 3 accrescent in fruit, concave, mucronate; inner ones small, membranous, spiculate. *Corolla* white, upto 2 in., sub-campanulate. *Stamens* 5; filaments broadened at base; anthers large at length, contorted. *Ovary* glabrous, 2-celled, 4-ovuled; style filiform; stigma 2, globose. *Capsule* globose, ·5-·75 in. across, dehiscing circumsciss or irregular. *Seeds* 4 or fewer, glabrous.

KAMRUP.

It is a purgative, well-known under the name of Turpeth root or Indian Jalap. The Jalap of British Pharmacopœia is the resin of Ipomæa purga *Hayne*. (Haines).

Flrs. 10-12. Fr. 1-2

14. ERYCIBE Roxb.

Usually large climbing shrubs. *Innovations* ferruginous, pubescent. *Leaves* entire, coriaceous. *Flowers* small in axillary or terminal racemose or panicled cymes; bracts lanceolate, small. *Calyx* 5-cleft; segments sub-equal, coriaceous, persistent, orbicular, adpressed to the base of fruit. *Corolla* white or yellowish; tube short, hairy externally; lobes 5, obcordate, indulplicate, contorted in bud. *Stamens* 5, sub-included; filaments short; anthers ovate-lanceolate. *Ovary* 1-celled, 4-ovuled; stigma large, sub-globose or conic, 5 or 10 ridged. *Berry* ovoid or ellipsoid, usually fleshy. *Seeds* solitary, glabrous; albumen scanty, intruded irregularly between the folds of the fleshy cotyledons; radicle inferior.

Cymes in terminal panicles, rarely axillary :— Branchlets more or less angular. Leaves obovate or obovate-oblong, covered with reddish-brown tomentum when young, abruptly acuminate. Flowers yellow.	1.	*E. paniculata.*
Cymes sub-spicate :— Branchlets angular, rusty-tomentose. Leaves elliptic or lanceolate-acuminate.	2.	*E. subspicata.*

Cymes short, axillary, often half as long as the leaves and in elongate terminal panicles :—
Branchlets almost glabrous. .. .. 3. *E. glaucescens.*
Cymes short, axillary towards the ends of branches and terminal but scanty panicled :—
Branchlets angular, sparsely pubescent.
Flowers yellowish-white. .. .. .. 4. *E. lævigata.*
Cymes in long terminal ferruginous-tomentose panicles. Leaves oblong-lanceolate, acuminate.
Flowers pale-white. .. .. .. 5. *E. albiflora.*

1. Erycibe paniculata *Roxb.* Vern. *Niguni-boallota,* Ass.

A large evergreen woody climber. *Bark* grey thin; blaze cream coloured; wood with floral design, phlœum pale when first exposed, soon turning deep dirty brown. *Leaves* 3·5·5 by 1·2-2·2 in., ovate-oblong, abruptly acuminate, entire, coriaceous, glabrous, dark glossy green above when mature, pale beneath; lateral nerves 4-6 on either half, arcuate; base acute; petiole ·3-·6 in. long. *Flowers* fragrant, yellowish in usually terminal rusty-tomentose, panicled drooping cymes up to 7 in. long; pedicels ·2 in. long. *Calyx* ferruginous-tomentose. *Corolla* campanulate; lobes marginate, crisped. *Stamens* included; filaments dilated at the base; anthers with a curved crown; stigma sessile, sub-globose, often 5-lobed. *Berry* ellipsoid, ·3-·5 in. in diameter, black when ripe, pulp dark purple. *Seed* elliptic.

LAKHIMPUR, DARRANG, SIBSAGAR.
Fruit ripens nearly after 12 months. Fruit is sweet and eaten. The bark is given in cholera by Santals (Haines).

Flrs. 2-4.

2. Erycibe subspicata *Wall.*

Branchlets angular, rusty-tomentose. *Leaves* 2-4 by 1-1·8 in., elliptic-lanceolate or broadly elliptic-accuminate, coriaceous, glabrous; lateral nerves 4-5 on either half, slender; base obtuse or acute; petiole ·2-·3 in. long. *Flowers* large in subspicate rusty-tomentose, peduncled cymes.

KAMRUP—Gauhati; KHASI HILLS.
Flrs. 4.

3. Erycibe glaucescens *Wall.*

A glabrous diffuse or sub-scandent shrub. *Leaves* 2-3 by ·9-1·5 in., elliptic-acuminate, entire, coriaceous, glabrous; lateral nerves 5-6 on either half, rather slender and obscure; base cuneate; petiole ·2-·3 in. long; cymes axillary or in terminal panicles. *Flowers* white, fragrant. *Corolla* lobes rusty-pubescent on the back.

CACHAR, SYLHET (Wall No. 1333).

Flrs. 9.

4. Erycibe lævigata *Wall.*

A large straggling or climbing shrub. *Branchlets* sparsely pubescent; older branches dark purplish. *Leaves* 2·5-6 by ·8-2 in., elliptic or oblong-elliptic, acuminate, distantly glandular, denticulate, sinuate, coriaceous, glabrous; lateral nerves numerous; midrib impressed above, stout and prominent beneath, tertiaries distinctly and elegantly reticulated; base rounded or cuneate; petiole ·3-·5 in. long. *Flowers* yellowish, usually in axillary short panicles. *Berry* globose, ·75 in. in diameter.

SIBSAGAR, KHASI HILLS.

Flrs. 12. Fr. 1-2.

5. Erycibe albiflora *Hallifer f.*

A large climber, 22 in. in girth; stem pale purplish; wood on transverse section with floral design. *Leaves* 4-6 by 1·3-2 in., oblong-lanceolate, acuminate, entire, coriaceous, glabrous; lateral nerves 4-6 on either half, conspicuous, arcuate, making an angle of about 30° with the midrib; base cuneate. *Flowers* pale-white in long terminal ferruginous-tomentose panicle. *Calyx* rusty-tomentose externally. *Corolla* bi-lobed; stigma conspicuously 5-lobed like a strand. *Fruit* ovoid, ·5 by ·3 in.

CACHAR, N. C. HILLS.

Flrs. 11. Fr. 2.

E. peguensis *Prain.*

A small tree; bark dark grey; branchlets angular-tomentose. *Leaves* 2-3 by ·8-1 in., lanceolate, entire, bluntly acuminate, coriaceous, glabrous; lateral nerves 5-7 on either half, slender; base acute or rounded, somewhat unequal; petiole about ·5 in. long. *Flowers* in terminal panicles. *Calyx* segments coriaceous, more or less orbicular, ·1 in. across, pubescent. *Corolla* campanulate, hairy; ovary globose. *Berry* blackish, ovoid, ·5 in. long, smooth.

KHASI AND JAINTIA HILLS (3,000 ft.).

Fr. 1.

15. CUSCUTA Linn.

Cuscuta reflexa *Roxb.* Vern. *Jerini-uthri, Meitiu-marwei,* Kh.; *Sunya-lota,* Sylh.; *Durimmel,* Garo; *Honboria-loti,* Ass.

A yellowish green glabrous twining parasite; stem minutely and irregularly often purplish verrucose, fleshy, usually forming dense masses on low trees and shrubs. *Flowers* white, waxy, about ·35 in. long and ·3 in. across, solitary or in irregular cymose clusters, sometimes racemed: racemes up to 1·5 in. long; bracts ·1 in., ovate to ovate-oblong, obtuse, narrower and smaller upwards; pedicels minute, up to ·1 in., verrucose. *Calyx* deeply 5-partite; lobes ovate, obtuse, ·15 in. long, whitish, often purple, verrucose in the back along the middle. *Corolla* subcampanulate; tube slightly ventricose towards the top with 5 oblong fimbriate incurved scales, which are connate at the base near the bottom; lobes 5, imbricate in bud, broadly triangular, reflexed, ·15 in. long. *Stamens* 5, inserted at the throat of the corolla tube and alternating with the lobes; filaments minute; anthers introrse. *Ovary* 2-celled; ovules 2 in each cell. *Style* minute; stigma 2, lanceolate. *Capsule* globose, ovoid, irregularly verrucose.

Common throughout the Province.

Destructive to hedges and shrubs. It is used as Veterinary medicine by Indian for poultice on sprains.

Flrs. 10-12. Fr. Cold season.

FAM. 93. SOLANACEÆ.

Herbs or shrubs, erect or climbing. *Leaves* alternate, often in pairs, rarely clustered, entire, lobed or pinnate, exstipulate. *Flowers* usually 5-merous, hermaphrodite, regular, rarely zygomorphic, in terminal or often lateral, axillary or extra-axillary cymes, sometimes solitary or clustered. *Calyx* persistent, sometimes enlarged in fruit. *Corolla* of various shapes, usually plicate in bud or lobes valvate, rarely imbricate; lobes deeply obcordate, so appearing as 10-lobed. *Stamens* epipetalous, isomerous and alternating with the corolla lobes or fewer in zygomorphic flowers; anthers ovate or oblong, dehiscing by apical pores or longitudinally. *Disc* hypogynous, usually distinct. *Ovary* superior, 2-celled, obliquely placed, sometimes with secondary division or reduced; ovules 1, anatropous or slightly amphitropous in peltate placentæ; style simple. *Fruit* baccate or capsular, many-seeded, opening by long valves or circumscissile dehiscence. *Seeds* compressed, discoid or subreniform; embryo often curved, peripheral, rarely straight; albumen fleshy.

This family is of not much forest interest but comprises many plants, which are officinal in British Pharmacopœia (Belladonna, Hyoscyamus, Datura, Nicotiana etc.) and are also of considerable economic importance (potato, tomato, brinjal, chilli, cape goose-berry etc.).

Embryo curved (more than a semicircle) :—

Stamens 5, fertile :—

Ovary 2-locular. Fruit baccate :—

Calyx reticulate, veined, inflated in fruit. Flowers solitary, axillary, yellowish or white. .. .. **1. Physalis.**

Calyx in fruit deeply cleft, minute, enlarged, 5 angled. .. .. **2. Nicandra.**

Calyx not greatly enlarged in fruit :—

Flowers 1-3, axillary; filaments longer than the anther. .. .. .. **3. Capsicum.**

Flowers cymose, usually extra-axillary. Leaves not pinnate; filaments shorter

than the anthers, opening by pores or short slit. .. .. .. **4. Solanum.***
Leaves pinnate; anthers opening by long slits. .. .. .. **5. Lycopersicum.**
Ovary 4-locular. Fruit capsular :—
Flowers very large, funnel-shaped or tubular. .. .. .. **6. Datura.**
Embryo straight or slightly curved :—
Stamens 5, fertile, exotics :—
Flowers often zygomorphic. Shrubs. Fruits baccate. .. .. .. **7. Cestrum.**
Herb. Fruit capsular. .. .. **8. Nicotiana.**

1. PHYSALIS Linn.

Physalis peruviana *Linn.* The cape goose-berry. Vern. *Soh-podok-rit,* Kh.

A bushy herbaceous annual. *Leaves* 1·5·5 by·6-3·3 in., ovate-entire, sinuate or shallowly lobed, acute or acuminate, membranous, hairy (probably reduced in cultivation); base cuneate or cordate; petiole 1 in. long. *Flowers* solitary, axillary. *Calyx* campanulate, greatly enlarged and bladder-like and enclosing the fruit. *Corolla* campanulate, ·5 in. across, with 5 large purple spots near the base. *Berry* globose. *Seeds* compressed.

KHASI HILLS (5,000 ft.).
Cultivated.
Flrs. & Fr. 8-10.

2. NICANDRA Adans.

Nicandra physaloides *Gærtn.*

An annual, glabrous herb. *Leaves* 3-6 by 1-2·5 in., ovate-lanceolate. *Flowers* pretty blue, solitary, 1-1·5 in. across. *Calyx* lobes deeply partite; segments ovate-cordate, much enlarged in fruit and 5-angular. *Corolla* campanulate, 5-lobed. *Ovary* 5-celled; stigma 5-lobed. *Berry* globose, ·5 in. in diameter. *Seeds* many, discoid.

KHASI HILLS—600 ft.
Flrs. & Fr. 8-10.

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* Some of the species have been transferred to genus *Lycianthes* Hassl.

3. CAPSICUM Linn.

Herbs or under-shrubs. *Flowers* axillary, solitary or in cluster of 2-3. *Calyx* campanulate, 5-toothed, often obscurely so, usually not enlarged in fruit. *Corolla* lobes 5, valvate. *Anthers* dehiscing longitudinally. *Berry* very variable. *Seeds* discoid, smooth or sub-scabrous.

Capsicum minimum *Roxb.* Vern. *Soh-mangken-eit-mai*, Kh. Brazil Pepper, apparently wild.
KHASI HILLS, KAMRUP, NOWGONG.

Flrs. Rainy season. Fr. Cold weather.

C. annuum *Linn.* & C frutescens *Linn.* are the Chillies.

Cultivated extensively throughout the Province, originally introduced from S. America, often found as escapes

Chillies are used by Indians medicinally for fever, sore throat, dyspepsia and other diseases.

4. SOLANUM Linn.

Herbs, shrubs or small trees, sometimes climbing, unarmed or spinous, hairs usually stellate. *Flowers* regular (rarely zygomorphous) in 2-chotomous or racemose cymes, often extra axillary; filaments usually shorter than the anthers; anthers connivent in a tube opening by terminal pores or short slit. *Fruit* baccate, globose or elongated. *Seeds* small, very many, discoid; embryo curved, peripheric; cotyledons linear; radicle terete.

Unarmed :—
- An annual herb :—
  - Roots tuberous. .. .. .. *1. S. tuberosum.*
  - Roots not tuberous :—
    - An annual herb. Flowers in umbellate cyme. .. .. *2. S. nigrum.*
    - Shrub or small tree, densely tomentose. Flowers white in corymbose cymes. .. *3. S. verbascifolium.*
    - Undershrub, glabrous or scarcely puberulous. Inflorescence densely and spirally racemed. .. .. *4. S. spirale.*
    - Shrub, nearly glabrous. Flowers clustered. Calyx cup-shaped in flowers. .. *S. subtruncatum.* (*Transferred to Lycianthes*)
    - Large shrub or small tree. Flowers purplish in densely stellate woolly racemes. *5. S. Kurzii.*
    - A small shrub. Flowers in clusters. Corolla purple-rose to white. Leaves

glabrous or sparsely setulose. (Corolla with 2 glandular pits near the base ?). *S. crassipetalum.* (*Transferred to Lycianthes*)

Armed :—

Leaves usually prickly. Corolla pubescent outside, densely stellate-tomentose :—

Flowers white :—

Leaves prickly. Calyx hirsute. Fruit hispid. .. .. 6. *S. ferox.*

Leaves unarmed or with very few prickles. Calyx unarmed. Fruit glabrous. .. 7. *S. torvum.*

Flowers blue :—

Racemes many-flowered. Berry small, globose, yellow. .. .. .. 8. *S. indicum.*

Racemes few-flowered. Berry large, purple, rarely white or yellow; few prickles on nerves or quite unarmed. .. 9. *S. Melongena.*

Flowers in lateral raceme. Berry size of a pea, quite enclosed in prickly enlarged calyx. Corolla blue. .. .. .. 10. *S. barbisetum.*

Flowers in few-flowered raceme. Berry 1 in. in diameter, not quite enclosed in the hirsute (not prickly) calyx. .. .. 11. *S. khasianum.*

Armed :—

Anthers long, usually attenuate half way up. Diffuse herb; prickles long, straight. Flowers blue. Leaves usually twice lobed or sub-pinnatifid. Berry size of a cherry. .. 12. *S. xanthocarpum.*

1. Solanum tuberosum *Linn.* The Potato.

A herbaceous annual; stem obscurely angular. *Leaves* pubescent; branches arising from the axils of the lowest leaves, grows horizontal under ground and wall up into tubers (Potatoes), by heaping earth against the stem, so as to cover more of the lower leaf axils, a large number of axillary shoots are made to become tuber bearing. *Flowers* about 1 in. across, bluish or white in subterminal cymes.

Extensively cultivated in ASSAM, two crops in KHASI HILLS, in the rainy season and in the cold season. In the Valley in the cold season.

2. Solanum nigrum *Linn.* The black nightshade.

A suffrutescent annual herbaceous weed. *Leaves* 1-5 by ·5-2 in., ovate-lanceolate or ovate-oblong, entire, sinuate, toothed or lobed, acute or acuminate, thin, glabrous; base narrowed into the petiole, ·7 in. long. *Flowers* white, small

in sub-umbellate cymes, extra axillary. *Calyx* sparsely puberulous, 5-toothed; segments rounded. *Corolla* glabrous outside, rotate, 5-lobed. *Ovary* glabrous; style bearded at base. *Berry* black, shining, but sometimes yellow or red when ripe, ·25-·3 in. in diameter, globose. *Seeds* discoid, minutely pitted.

KHASI HILLS (upto 5,500 ft.).

Flrs. & Fr. 7 (practically throughout the year except cold weather).

In Hindu medicine it is considered a tonic. In Bengal, the leaves are used in fever, diarrhœa and eye diseases.

It is also used in chronic enlargement of spleen and is considered a valuable alterative and diuretic.

3. Solanum verbascifolium *Linn.* Vern. *Khimkhanagong,* Garo; *Ahom-bhola-arong,* Mik.; *Phuslu, Misi-moujela,* Kach.; *Bordap,* Kuki; *Dieng-soh-mong-niang-kadong,* Kh.

A shrub (18′/16″), crown flat; bark greenish grey; stem extremities and inflorescence stellately woolly. *Leaves* 2·5-9 by 2-4 in., elliptic-lanceolate, ovate-lanceolate, acute or acuminate, entire, sub-coriaceous, rather herbaceous, stellately woolly or tomentose, with an unpleasant smell when bruised; base rounded or truncate, rarely cuneate; petiole ·5-2 in. long. *Flowers* white, in woolly dense corymbose sub-terminal cymes. *Calyx* cup-shaped; segments short, deltoid, enlarged in but shorter than the fruit. *Corolla* ·7 in. in diameter, stellate tomentose outside. *Stamens* on the throat of the corolla; anthers not attenuate dehiscing by apical slits. *Ovary* hairy; style glabrous. *Berry* stellate when young, yellow when ripe, globose, 3·5-4 in. in diameter.

NOWGONG, KAMRUP, GOALPARA, DARRANG, N. C. HILLS, GARO HILLS, KHASI & JAINTIA HILLS.

The leaves and fruit are used in Indian medicine.

Flrs. & Fr. Almost throughout the year.

4. Solanum spirale *Roxb.* Vern. *Titakuchi,* Ass.; *Oko-oing,* Miri; *Lora-tita,* Goalp.; *Soh-jaring, Soh-jhari,* Kh.; *Dieng-sa-ryngang-khlein-dong,* Synt.

An undershrub upto 12 ft. high; stem erect with 1 or 2 sharp ridges. *Leaves* 2-7 by ·8-3 in., (each leaf is subtended

by a small leaf often much reduced), elliptic, entire, acute, membranous, glabrous; lateral nerves about 7 on either half; base alternate; petiole ·6 in. long. *Flowers* small, in dense spirally arranged racemose extra axillary inflorescence. *Calyx* ·16 in. across, adpressed to base of fruit (not reflexed). *Corolla* ·6 in. across, almost glabrous, deeply lobed. *Ripe* berries orange-red, globose, ·3 in. in diameter. *Seeds* smooth, ·12 in. in diameter.

N. E. F. TRACT, LAKHIMPUR, SIBSAGAR, DARRANG, GOALPARA, KHASI & JAINTIA HILLS (upto 5,000 ft.).

The root is given as a narcotic and diuretic in doses of from gr. ¼ to grs. VIII (Irvine).

Fruit eaten both raw and cooked. Leaves are also eaten cooked.

Flrs. 5-9. Fr. Cold season.

5. Solanum Kurzii *Br. Vern. Khim-kha*, Garo.

A shrub 3-4 ft. high, extremities and leaves densely stellate-tomentose. *Leaves* 1-3·5 by ·5-2·5 in., ovate, entire or more or less irregularly lobed, more densely and stellately woolly beneath, rather herbaceous; base rounded or acute; petiole ·5-1·3 in. long. *Flowers* small in rusty woolly stellately pubescent sub-terminal racemose cymes. *Calyx* stellately pubescent; teeth oblong-lanceolate, slightly enlarged in fruit. *Corolla* deeply divided, oblong-lanceolate, 1 lobe longer than the other 4, stellately pubescent outside. *Style* produced beyond the anthers. *Berry* glabrous, globose, ·25-·3 in. in diameter, bitter.

GARO HILLS (1,200 ft.).

Fruit is eaten cooked.

Flrs. & Fr. 3.

6. Solanum ferox *Linn.*

A coarse undershrub; young parts densely brown, stellately woolly and prickly. *Leaves* 5-9 by 3·7 in., ovate or suborbicular, rather shallowly lobed; lobes blunt, rather membranous with stellate hairs beneath as well as above, with compound prickles on the nerves and midrib; base truncate; petiole upto 3·5 in. long. *Flowers* in short lateral

cymes. *Calyx* densely hirsute; segments ovate, acute. *Corolla* densely villous outside. *Berry* globose, about 1 in. in diameter, hispid.

ASSAM (F B.I.), KHASI & JAINTIA HILLS.
The leaves are used medicinally (Watt).

Flrs. & Fr. Cold season.

7. Solanum torvum *Swartz.* Vern. *Bekhoir*, Sylh.; *Bongali-aheso-arong*, Mik.; *Dieng-soh-nang*, Kh.; *Bhit-tita*, Ass.; *Hatibhekuri*, Sib.; *Khem-khatai-baphang*, Kach.; *Tokra-kur*, Lush.; *Khanga*, Manip.; *Konthai-Raja*, Mech; *Khing-gathai-phang*, Kach.; *Kham-chok-raling*, Kuki.

A shrub 8-12 ft. high, sparingly armed, sparsely stellate pubescent. *Leaves* 2-6 by 1·5-5 in., ovate, serrate or lobed, shortly acuminate, membranous, sparsely stellate-pubescent above, more closely so beneath; base unequal or rounded; petiole ·5-1 in. long. *Flowers* white, about ·7-1 in. across, in dense lateral usually extra-axillary often branched, unarmed cymes; pedicels slender, ·4 in. long, upto ·75 in. in fruit, pubescent. *Calyx* ·2 in. across, unarmed, abruptly apiculate. *Corolla* stellate, pubescent outside; lobes spreading, linear-oblong or lanceolate. *Berry* globose, ·5-·6 in. in diameter, seated on a persistent calyx (not accrescent) and the thickened pedicel.

SYLHET, CACHAR, N. C. HILLS, GOALPARA, SIBSAGAR, LAKHIMPUR, NOWGONG, DARRANG, KAMRUP, KHASI & JAINTIA HILLS.

Flrs. & Fr. 9-10.

8. Solanum indicum *Linn.* Vern. *Soh-mongken-sning, Soh-ngang*, Kh.; *Lobo-hapi*, Mik.; *Bhot-bengna, Deuri-tita, Tit-bhakuri, Bhekuri*, Ass.; *Heso-bongai-arong, Hecho*, Mik.

A shrub upto 10 ft. high; branches herbaceous. *Bark* smooth, pale brown or greenish grey, warty, armed; blaze greenish; often with curved prickle; young parts and inflorescence thickly stellate-tomentose. *Leaves* 2-5 by 1·3·5 in. ovate or oblong, serrate or obtusely lobed; lobes often sub-

acute or acute, thinly herbaceous, stellate-tomentose, green above, grey or dirty tomentose beneath; prominently on the nerves and midrib beneath; lateral nerves 3-5 on either half; base usually truncate, unequal; petiole upto 1·5 in. long. *Flowers* bluish purple, ·5-·75 in. across, in extra-axillary or sub-terminal racemose cymes; pedicels and peduncle often prickly; pedicels ·8 in. long, thickened above. *Calyx* stellate, pubescent outside, usually prickly. *Corolla* tomentose outside; lobes reflexed. *Fruit* globose, smooth, 1-1·25 in. in diameter, yellow.

SIBSAGAR, N.-E. F. TRACT, DARRANG, NOWGONG, KAMRUP, N. C. HILLS, GOALPARA, KHASI & JAINTIA HILLS.

Leaves used for fermenting liquor. Fruit is eaten as vegetable and used in febrile affections and colics. Root is efficacious in tooth-ache and also useful as an expectorant, cough and catarrhal affections.

Flrs. 6-10. Fr. Cold season.

9. Solanum Melongena *Linn.* Vern. *The brinjal, Soh-baingon,* Kh.; *Bengna,* Ass.

In cultivation the fruits grow to a very great size and prickles are reduced, many distinct forms or races are recognised.

The fruits are eaten cooked as a vegetable, the seeds are used as a stimulant and the leaves as a narcotic (Atkinson).

Cultivated throughout ASSAM.

Flrs. & Fr. throughout the year.

10. Solanum barbisetum *Nees.* Vern. *Soh-podok, Shiah,* Kh.

An undershrub. *Leaves* 2-7·5 by 1-5 in., pinnatifid, prickly on the nerves and midrib, woolly on both surfaces; petiole upto 2 in. long, prickly. *Flowers* medium sized, in lax extra-axillary or sub-terminal racemes. *Calyx* ovate-lanceolate, hairy. *Corolla* lobes linear-oblong, acute. *Berry* globose, ·6 in. in diameter, glabrous, enclosed in the prickly accrescent calyx. *Seeds* rugose, but not villous.

KHASI HILLS 5,000 ft.

Fruit eaten when ripe.

Flrs. & Fr. 8-5.

11. Solanum khasianum *Clarke.*

A stout undershrub 3-4 ft. high; young parts densely yellowish, hirsute and prickly. *Leaves* 1-5 by ·8-4·5 in., ovate-acute, lobed; lobes acute, rather coriaceous, hirsute and prickly on both surfaces, specially along the midrib and the nerves; base truncate or sub-cordate; petiole upto 2 in. long. *Inflorescence* lateral, few flowered; pedicels upto 1 in. in fruit. *Calyx* hirsute (not prickly); segments lanceolate. *Corolla* ·35 in. across; lobes lanceolate. *Stamens* symmetrical. *Berry* yellowish, globose, about 1 in. in diameter.

KHASI HILLS 5,000 ft. (Mann's Nos. 46 & 50).

Flrs. 7. Fr. 11.

12. Solanum xanthocarpum *Schrad. & Wendl.* Vern. *Dieng-sa-pydok-bak-thang,*=(bitter brinjals), Synt.; *Birkulitita,* Ass.

A perennial herb. *Stem* and leave both above and below with sharp straight prickles, also pubescent. *Leaves* pinnatifid. *Flowers* deep blue, 1-1·5 in. across, in few flowered cymes. *Calyx* lobes recurved, scarcely accrescent. *Fruit* globose, yellow when ripe, upto 1 in. in diameter, variegated or green when young.

GOALPARA, KHASI & JAINTIA HILLS.

The fruits are eaten as vegetable. The plant is medicinal and is much esteemed as an expectorant and diuretic in bronchial disease.

The root is largely used in catarrhal and febrile affection.

Flrs. & Fr. 12-2.

Solanum sisymbrifolium *Lam.* Var. Balbissii (Dunn).

A viscid undershrub armed with prickles. *Leaves* pinnatifid or twice pinnatifid, armed with prickles. *Flowers* white or violet in racemed clusters. *Calyx* tube inflated, cup-shaped, accrescent and enclosing the berry, but ultimately the segments are reflexed.

An escape (Native of AMERICA).

Flrs. Cold season. Fr. 4-5.

The following species which originally belonged to the Genus *Solanum* Linn., have now been transferred to the Genus *Lycianthes* Hassl.

Lycianthes subtruncata *Hassl.* (Solanum subtruncatum Wall.) Vern. *Bonbhekuri,* Ass.

A shrub about 7 ft. high, sometimes straggling. *Leaves* 1-5 by ·6-1·5 in., lanceolate, elliptic-lanceolate, entire, acuminate, membranous, glabrous, (Khasi hills specimens) puberulous below (Sibsagar collection); base acute or cuneate; petiole ·2-·3 in. long *Flowers* bluish-white in axillary clusters; pedicels upto ·6 in. long. *Calyx* cup-shaped, almost entire, saucer-shaped in fruit, ·2 in. across; teeth obscure. *Corolla* glabrous outside, ·25 in. long, 5-lobed. *Stamens* yellow. *Berry* globose, glabrous, ·25 in. in diameter.

SIBSAGAR, KHASI HILLS.

Flrs. & Fr. 7-12.

L. pachypetala *Hassl.* (Solanum crassipetalum Wall.)

A shrub. *Leaves* 4·5-6 by 1·2-2·5 in., elliptic-lanceolate, entire, acuminate, membranous, almost glabrous; lateral nerves distinct but slender, about 7 on either half; base narrowed into the petiole, upto ·8 in. long. *Flowers* in axillary clusters; pedicels ·5-·7 in long. *Calyx* cup-shaped with linear triangular teeth, glabrous *Corolla* lobes oblong, acute, ridged or veined. *Berry* ovoid, ·25 in. in diameter, glabrous, beaked.

KHASI HILLS. (Mann's collection No. 136).

Flrs. 8-9. Fr. Cold season.

L. macrodon *Hassl.* (Solanum macrodon Wall.)

A small shrub. *Leaves* upto 6 in. long, elliptic-lanceolate, entire, acuminate, setulose above; base narrowed into the petiole ·1-·75 in. *Flowers* in cymes (2-8 rarely, solitary). *Calyx* teeth ·16 in., linear, hispidulous. *Corolla* ·3-·5 in.; lobes purplish or light pinkish with 2 glandular spots near the base, oblong-acute *Berry* ·25 in. across, globose. *Seeds* ·1 in. across, more or less triangular, smooth.

KHASI HILLS (3-5,000 ft.). (F.B.I. IV. 232).

5. LYCOPERSICUM Miller.

Lycopersicum esculentum *Mill.* The tomato.

A pubescent herb. *Leaves* irregularly pinnate, often 2-pinnate-serrate. *Flowers* yellowish in few flowered cymes. *Fruit* red or yellowish.

Native of SOUTH AMERICA. Cultivated throughout the Province, wild in N. C. HILLS (U. Kanjilal's No. 5573).

Flrs. & Fr. Throughout the year.

6. DATURA Linn.

Coarse shrub like herb, rank scented. *Leaves* large, simple, entire, sinuate or toothed. *Flowers* large, white or purple, solitary. *Calyx* elongate, tubular, 5-toothed, often 5-ribbed. *Corolla* tubular, funnel-shaped; limb plicate. *Stamens* attached near the base of the corolla, included; anthers dehiscing longitudinally. *Ovary* 2 or spuriously 4-celled. *Fruit* usually capsular, often spinous, 4-valved or irregularly breaking up. *Seeds* many, compreessed, rugose; embryo peripheric.

Flowers purple or white, 2·5-5 in., glabrous, deeply 4-valved :—	
Fruit prickly, spines more or less sharp. ..	1. *D Stramonium.*
Flowers white or purple, 5-7 in.:—	
Fruit globose, irregularly breaking up; spines blunt.	2. *D. fastuosa.*

1. Datura Stramonium *Linn.*

A coarse annual; stem green or purplish. *Leaves* 3-7·5 by 1·5-5 in., sinuate or obscurely lobed, sparingly hairy on the nerves beneath; petiole ·3-1 in. long. *Calyx* tubular, 5-angled. *Capsule* dehiscent, deeply 5-valved; spines very sharp.

NOWGONG, KHASI HILLS (5,000 ft.).
Officinal in both Pharmacopœia (*I. M. Plant*).

Flrs. & Fr. Rainy season.

Var. Tatula *Willd.*, flowers purplish without and within.

The young fruits are said to be sedative and slightly intoxicating (Ainslie).

KHASI & JAINTIA HILLS (6,000 ft.).

Flrs. & Fr. Rainy season.

2. Datura fastuosa *Linn.*

Attains about 5 ft., almost glabrous. *Leaves* 3-8 by 1·3-3·5 in. long, ovate-acute, sinuate, obtusely lobed or

toothed. *Flowers* 5-7 in. *Corolla* usually purplish outside; lobes with acuminate lips. *Fruit* nodding.

KHASI HILLS (5,000 ft.).

The seeds, leaves and fruit juice are narcotic, anodynes and antispasmodic. The seeds constitute a powerful poison. An alkaloid daturine is useful as a substitute for Belladona (*I. M. Plant*).

Flrs. 6.

7. CESTRUM Linn.

Cestrum nocturnum *Linn.* The lady of the Night. *Hasnahana,* Beng.

A straggling shrub. *Leaves* ·5 by 1·5 in., lanceolate. *Flowers* very fragrant at night, greenish-yellow, tubular, funnel-shaped in panicled cymes.

Cultivated throughout the Province.

C. fasciculatum *Miers.* Also cultivated in KHASI HILLS.

Cyphomandra betacia *Send.* The tree tomato, native of S. AMERICA. Cultivated in KHASI HILLS.

Browallia, Schizanthus and Petunia are the well-known garden plants.

8. NICOTIANA Linn.

Nicotiana plumbaginifolia *Viv.* Vern. *Ululai,* Ass.

A hairy herbaceous weed about 2 feet high; stems slender, leafly. *Leaves* sessile, semi-amplexicaul, various, oblong-lanceolate to obovate-spathulate, entire or undulate, glabrescent. *Flowers* whitish in terminal racemes. *Calyx* ·4-·5 in.; segments linear-lanceolate. *Corolla* salver-shaped. *Capsule* ·4 in., ovate, glabrous; seeds minutely rugose.

SIBSAGAR (Brahmaputra Bank).

An occasional wild weed (Native of MEXICO and WEST INDIES).

Flrs. & Fr. Hot season.

N. Tabacum *Linn.* Tobacco.

An erect glandular pubescent herb. *Leaves* large, ovate-oblong or elliptic, acuminate, pubescent. *Flowers* 1·5-2 in. long, rosy or reddish, bracteate, usually in many flowered panicled racemes. *Calyx*

·4-·5 in. long; segments lanceolate-acute, unequal. *Corolla* ·7 in. across; throat inflated; lobes spreading; capsule ·6-·7 in. long with the slightly accrescent calyx.

Native of AMERICA; cultivated in all the warmer districts of the Province.

KHASI HILLS (cultivated in Government garden).

The tobacco of commerce

Flrs. Hot season

Lycium europæum *Linn.*

A spinous, nearly glabrous shrub. *Leaves* often fascicled in dwarf shoots, very variable, oblong-lanceolate. *Flowers* purplish or whitish, solitary or in fascicles *Calyx* irregularly 5-toothed. *Corolla* ·5 in., lobes usually 5, imbricate. *Filaments* glabrous. *Ovary* 2-celled; style filiform; stigma sub-capitate. *Berry* sub-globose, bright red, ·15-·25 in. in diameter.

KHASI HILLS (G. Mann's No. 111).

FAM. 94. SCROPHULARIACEÆ.

Usually herbs, often semi-parasitic. *Leaves* simple, alternate, opposite or whorled, sometimes gland-dotted, exstipulate. *Flowers* bisexual, more or less zygomorphic, solitary, axillary in racemes or spikes or in cymes, often united into complex inflorescences. *Calyx* usually persistent; segments usually 5, (rarely 4), æstivation various. *Corolla* 4-5-lobed, medianly zygomorphic, sometimes nearly regular, often 2-lipped. *Stamens* usually 4, didynamous or sub-equal with or without staminodes; anthers various, 1 or 2-celled. *Disc* annular, cupular or glandular. *Ovary* superior, 2-celled, medianly placed placenta axile; style simple or bilobed; stigma capitellate or dilated, occasionally bilobed or 2-lamellate; ovules usually many, rarely few, anatropous or amphitropous. *Fruit* surmounted by the persistent calyx,

usually a capsule, rarely baccate. *Seeds* usually numerous, small, albuminous; embryo straight or curved.

Corolla bilabiate, broad and saccate at base, all leaves or the lower only opposite. .. **1. Antirrhinum.**
Corollla tubular (not saccate or spurred) :—
  Anthers confluent :—
    Capsule septicidal :—
      Calyx 5-fid, herb. .. .. .. **2. Scrophularia.**
      Calyx 3-4-fid, trec. .. .. .. **3. Wightia.**
  Anthers contiguous :—
    Capsule loculicidally 2-valved. .. .. **4. Mazus.**
  Anther-cells separate. Stamens 4, included :—
    Calyx campanulate, 5-fid. Capsule 2-valved, loculicidal. .. .. .. **5. Lindenbergia.**
    Calyx segments equal, sometimes very enlarged in fruit. Stamens all perfect. Capsule septate or loculicidal. Seeds angular. .. .. .. **6. Limnophila.**
  Anthers conniving or cohering in pairs :—
    Calyx segments 5, narrow; stamens 2 perfect; capsule long .. .. **7. Bonnaya.**
Corolla sub-rotate :—
  Anthers sagittate or horse shoe-shaped. Stamens as many as corolla lobes :—
    Calyx segments 5; corolla 5-lobed, creeping herbs. .. .. .. **8. Hemiphragma.**
    Calyx 4-5-partite; corolla 4-lobed; erect herb. .. .. **9. Scoparia.**
Corolla spreading :—
  Anther-cells 2, distinct. Calyx lobes valvate, campanulate. Corolla oblique. Spikes bracteate, root parasite .. .. .. **10. Alectra.**
Corolla 5-merous; tube dilated above; lobes broad, subequal :—
  Anther-cells imperfect, one cell stipitate and empty. Calyx campanulate, 5-toothed. Herbs. .. .. **11. Sopubia.**
Corolla bilabiate :—
  Anther-cells distinct; ovules more than 2 in each cell :—
    Calyx segments 2-5, margins of hood of corolla straight. .. .. .. **12. Pedicularis.**

1. ANTIRRHINUM Linn.

Antirrhinum majus *Linn.* The Snapdragon, commonly cultivated in gardens.

Flrs. & Fr. Almost throughout the year.

2. SCROPHULARIA Linn.

Scrophularia elatior *Benth.*

A tall, stout perennial, semi-woody. *Leaves* ovate-elliptic or lanceolate. *Flowers* in large much branched panicled cymes. *Calyx* deeply partite; segments ovate-lanceolate, persistent, about half the length of the fruit. *Capsule* ovoid, beaked.

KHASI HILLS (5,000 ft.).

Fr. 7.

Brandisia rosea *W. W. Smith.*

An erect or sub-erect shrub; branches densely white, stellate-tomentose. *Leaves* 1·5-2 by ·4-·6 in., lanceolate, somewhat chartaceous, acute, sparsely stellately puberulous above or glabrescent, white tomentose beneath; nerves impressed above; base cuneate; petiole ·1-·2 in. long. *Flowers* rosy, axillary *Calyx* campanulate, ·3- 4 in. long. *Corolla* 8-1 in. long, tubulose, curved; tube ·2-·3 in. across, glabrous inside; lobes ·2 in. long, emarginate. *Anthers* densely barbate. *Ovary* densely tomentose; style somewhat pilose.

3. WIGHTIA Wall.

Wightia gigantea *Wall.* Vern. *Ka-slang*, Kh.

A large evergreen epiphytic tree clasping the boles of tree with horizontal ærial roots. *Leaves* 5·5-7·5 by 3-5 in., elliptic or ovate-elliptic, acute or obtuse, coriaceous, glabrous; lateral nerves oblique, 6-7 on either half; base cuneate or rounded; petiole 1-1·5 in. long. *Flowers* pinkish in axillary dense-forked thyrsoid cymes. *Calyx* short. *Corolla* 1 in. long, mealy. *Stamens* exserted. *Capsule* 1·5 by ·75 in., ovoid.

KHASI HILLS (3.200), MANIPUR.

Flrs. 10-11. Fr. 3.

4. MAZUS Lour.

Mazus rugosus *Lour.*

A small prostrate herb growing in wet localities. *Branches* hairy or pubescent. *Leaves* mostly radical, ·3-1·8

by ·2-·4 in., almost sessile. *Flowers* pale blue or white in scapiform racemes.

KHASI HILLS, upto 6,000 ft.

Flrs. & Fr. practically throughout the year.

5. LINDENBERGIA Lehm.

Lindenbergia Griffithii *Hk. f.*

A perennial about 6-8 ft. high, shrubby, silky-villous *Leaves* 1·5-5 by ·5-1·5 in., ovate-lanceolate, acuminate, pubescent above; petiole ·1-·4 in. long. *Flowers* in axillary or terminal racemes; corolla purplish-brown, hairy. *Lip* of corolla yellow spotted. *Capsule* ovoid, turgid.

KAMRUP.

Flrs. 1. Fr. Hot season.

L. ruderalis (*Retz.*) *Z.O.*=L. urticæfolia Lehm.

An annual pubescent herb with aromatic odour, upto 6 in. high. *Leaves* ·5-1·5 by ·2-·8 in., membranous; petiole ·7 in. long. *Capsule* ovoid, pubescent.

KHASI HILLS, upto 5,000 ft.

The juice is used in chronic bronchites, also applied in skin eruptions mixed with coriander (*I. M. P.*).

Flrs. 8. Fr. Cold season.

L. Hookeri *Clarke ex. Hook. f.*

A slender, loose bushy shrub, almost glabrous. *Leaves* 2-3 in. long, ovate-acuminate, coarsely serrate, pubescent; base cuneate; petiole ·25-·3 in. long. *Flowers* spicate (not showy). *Calyx* segments acute. *Corolla* 1 in. long, pubescent; tube long, lower lip bright-yellow, lower dull with brown flesh. *Anther* cells sausage-shaped. *Ovary* glabrous.

ASSAM, Lohit Valley and Delai Valley, (Kew Bulletin 1934). (F.B.I. IV, 261).

Flrs. & Fr. Cold season.

L. philipinensis *Benth.*

A tall, erect, herb, 2-3 feet high. *Leaves* 2-4 in. long, ovate-lanceolate or ovate-acute, dentate; petiole long, about half the length of the blade. *Flowers* in rigid densely flowered spike or racemes. *Calyx* longer than the bracts; segments ovate-lanceolate, acuminate.

Corolla ·25-·6 in. long, pubescent. *Ovary* villous. *Capsule* lanceolate with exserted tip.

NAGA HILLS (F.B.I. IV, 261).

Flrs. 1-3. Fr. 4-5.

6. LIMNOPHILA Br.

Limnophila chinensis (*Osb.*) *Merr.*=**L. hirsuta** Benth

Herbaceous plant about 1 foot high or more, thick with large vertical air chambers, hairy. *Leaves* ·5-1·5 by ·2-·5 in., sessile, opposite or ternate. *Flowers* solitary, axillary or the upper somewhat corymbosely racemose; pedicels with spreading hairs. *Calyx* hirsute, longer than the capsule, 5-partite, ·25 in. long. *Corolla* tube ·5 in. long, greenish-brown or brownish-white; lobes 4, light purplish; upper lobe undivided. *Stamens* 4, 2-long, 2-short. *Stigma* lamellose. *Capsule* oblong. *Seeds* angular.

KHASI & JAINTIA HILLS, in wet plains.

Flrs. & Fr. 11.

L. indica (Linn.) *Druce*=**L. *gratioloides*** Br

A small herb growing in swamps and wet localities with a turpentine smell. *Leaves* small, whorled, pinnatifid. *Flowers* usually solitary, axillary; pedicels larger than the calyx. *Calyx* hemispheric in fruit. *Corolla* ·3 in.

ASSAM.

It is considered to be an antiseptic by the Hindus; also used in dysentery combined with ginger, cumin and other aromatics. Liniment with cocoanut oil is used in elephantiasis (*I M.P.*).

Flrs. 4.

L sessiliflora *Blume* also occurs in the province.

Curanga amara *Juss.*

A glabrous straggling annual. *Leaves* opposite, 1·5-2·5 by ·9-1·2 in., ovate, crenate, rather obtuse, membranous, glabrous; lateral nerves 5-8 on either half, oblique, arcuate; base unequal sided; petiole upto ·7 in. long. *Flowers* in terminal or pseudo-axillary racemes. *Calyx* segments 4; lower much enlarged (rather inflated) in fruit. *Corolla* upper lip notched, lower 3-fid. *Stamens* 2. *Capsule* almost orbicular, compressed, septicidal, about ·3 by ·5 in., enveloped in the enlarged calyx. *Seeds* rugose.

NOWGONG (Diphu), CACHAR, MISHMI HILLS.

Flrs. Hot season. Fr. 7.

7. BONNAYA Link et Otto.

Bonnaya reptans *Spreng.*=Ilysanthes ciliata (*Colsm*) O. Ktze. Vern. *Sam-tham-lang, Sam-gichhok*, Garo.

A weed on roadside, trailing. *Leaves* opposite, ·5-2 by ·3-·8 in., ovate-oblong, sharply serrate; petiole ·1-·5 in. long. *Flowers* in racemes; pedicels short, ebracteolate. *Corolla* purplish, ·75 in. long. *Capsule* very slender, about 1 in. long, much longer than the calyx.

LAKHIMPUR, GARO HILLS.
Flrs. & Fr. 10-3.

8. HEMIPHRAGMA Wall.

Hemiphragma heterophyllum *Wall.*

A pubescent herb; stem slender, loosely tufted, prostrate. *Leaves* dimorphic; stem leaves opposite, ·3-·5 by ·2-·3 in., orbicular, cordate, short petioled; bracts linear, tufted, ·5 in. long or less acute, sessile. *Flowers* pinkish, ·3 in. across, axillary, solitary. *Calyx* 5-partite. *Corolla* tube slender, short; lobes 5, spreading, broad, nearly equal. *Stamens* 4, equal. *Fruit* capsular, 2-valved, ultimately septicidal, black, shining.

KHASI HILLS (5,500 ft.)
Flrs. 8. Fr. 12.

9. SCOPARIA Linn.

Scoparia dulcis *Linn.*

A branching erect annual 2 ft. high or more, semi-woody, foetid. *Leavss* opposite or ternately whorled, ·5-1 by ·11-·3 in., rhomboid or elliptic, serrate, punctate, sessile. *Flowers* small, axillary, ebracteolate. *Calyx* segments imbricate in bud, 3-nerved; shorter than the capsule. *Corolla* white, ·13 in. across; throat densely bearded. *Filaments* woolly at base. *Capsule* small, globose, ·14 in. in diameter, septicidal. *Seeds* many, obovoid, angled, scrobiculate.

CACHAR, KHASI & JAINTIA HILLS (5,000 ft.).
Flrs. & Fr. 6-1.

Veronica cana *Wall.*

A perennial herb; root-stock woody, creeping; stem 4-12 in. high, erect *Leaves* 1-2 in. long, ovate or ovate-cordate, crenate, pubescent or glabrate; petiole ·5- 6 in. long. *Flowers* blue, ·5 in. across in axillary racemes *Calyx* segments unequal, linear-oblong. *Capsule* ·25-·3 in. across, broadly deltoid, notched at the top.

ASSAM. (F.B I. IV, 295).

Flrs. 6-7. Fr. 10-11.

V. capitata *Benth*

A pubescent annual with perennial roots. *Leaves* sessile or shortly petioled, ·5-1 in. long, rounded, ovate, or shortly oblong, obtuse, crenate-serrate or subentire, pubescent; base rounded. *Flowers* in terminal, sessile, villous umbels or heads. *Calyx* segments ·16 in. long, spathulate. *Corolla* ·25 in. across, blue. *Capsule* ·16 in. across, obcordate, ciliate.

ASSAM. (F.B I. IV, 295).

Flrs. 7-8. Fr. 10

V. javanica *Bl*

A much branched pubescent annual. *Leaves* ·7-1·4 by ·5-·9 in., ovate, obtuse or acute, crenately serrate, more or less pubescent; base truncate, subcordate or rounded; petiole short, about ·1 in. long. *Flowers* in few flowered racemes, terminal, axillary. *Corolla* ·2-·3 in. across. *Capsule* pubescent.

KHASI HILLS (5,000 ft.).

Flrs. & Fr. 12-2.

V. talaumifolia *Hk. f.* Var. hirsuta Fischer.

A tree. *Leaves* large, obovate-lanceolate, acute, entire or remotely dentate, glabrous above, pubescent on the nerves beneath, petiolate; base long, attenuate. *Head* 7-12 flowered. *Corolla* glabrous towards the apex. *Achenes* 10-costate, glabrous.

ASSAM.

Flrs. Cold season.

10. ALECTRA Thunb.

Alectra indica *Benth.*

A herb, about 1 foot high or more. *Leaves* upper alternate, lower opposite or sub-opposite, ·5-1·5 by ·2-·6 in

almost sessile, lanceolate or oblanceolate, 3-nerved. *Flowers* yellow, solitary, axillary, very shortly pedicelled; bracts 2, filiform, ·25-·3 in. long. *Calyx* persistent, 5-fid, 10-ribbed; segments deltoid, acute, keeled, pubescent outside, connecting the fruit. *Corolla* limb oblique, sub-equally 5-lobed; lobes spreading, the outer lower in bud, yellow marked inside, each lobe with 3 straight brownish nerves. *Stamens* 4, didynamous. *Stigma* fusiform, fleshy. *Seeds* numerous on fleshy axile placentas; epicarp scarious.

KHASI HILLS (5,000 ft.).

Flrs. & Fr. 10-11.

11. SOPUBIA Ham.

Sopubia trifida *Ham.*

An erect herb. *Leaves* ·5-1 in., linear or 3-fid. *Flowers* yellowish; pedicels ·5-·75 in. *Calyx* woolly within. *Corolla* sub-rotate. *Stamens* didynamous; anthers meeting in pairs. *Capsule* ovoid, loculicidal. *Seeds* numerous.

KHASI HILLS (5,000 ft.).

Flrs. 5-6. Fr. 10.

12. PEDICULARIS Linn.

Pedicularis gracilis *Wall.*

Shrubby, much branched, upto 2 ft. long, 4 lines of hairs running down the stem. *Leaves* whorled, ·3-·8 in., oblong-lanceolate, deeply pinnatifid, glabrous. *Flowers* incurved behind, pink, sessile, axillary, solitary or racemed. *Corolla* ·5 in. long; tube scarcely longer than the calyx; beak nearly straight. *Capsule* ·3-·5 in. long, oblong, acute, many seeded.

KHASI & JAINTIA HILLS (6,000 ft.).

Flrs. 10.

P. Clarkei *Hk. f.*, P. carnosa *Wall.*, P. Maximowiczii *Krasn. Benth.*, P. Brandisii *Benth.*, P. fragilis *Benth.*, also occur in the Province.

P. curvipes *Hk. f.*

A slender glabrous herb; branches flexuous. *Leaves* ·4-1·5 by ·2-·8 in., pinnatifid, oblong; lobes again incised; petiole ·3-·7 in. long. *Flowers* axillary; pedicels ·3-·5 in. long. *Calyx* campanulate. *Corolla* bilabiate; lower lobes spreading. *Capsule* slightly oblique, oblong, pendulous.

NAGA HILLS (10,000 ft.).

Flrs. 10-11.

P. Pantlingii *Prain.*

A small herb *Leaves* broadly ovate, sub-cordate, shallowly pinnately lobed; lobes rotundate, dentate; petiole 2·4 in long *Flowers* purplish pink, racemose. *Calyx* campanulate, hirsute. *Corolla* lip 3-lobed, ciliate. *Filaments* slightly puberulous. *Ovary* lanceolate; stigma exserted. *Capsule* ·8 in. long, broad. lanceolate, acute. *Seeds* broadly ovate; testa blackish, minutely reticulate.

Delai Valley (Kingdon Ward 8398). 11-12,000 ft.

Flrs. 7.

P. Gammieana *Prain.*

A very small herb. *Leaves* small, much incised, often fascicled. *Flowers* purple, racemose. *Calyx* ·3 in. long, 5-toothed, campanulate, hirsute. *Corolla* tip 3-lobed; tube ·66 in. long. *Stamens* inserted about the middle of the tube; filaments barbellate. *Ovary* ovoid-lanceolate; stigma exserted.

Delai Valley (Kingdon Ward 8397). 12,000 ft.

Flrs. 7.

P. corymbosa *Prain.*

A small herb, rhizomate. *Leaves* 2·2 by ·4 in., carnose or herbaceous, shortly petiolate, ovate or oblong-obtuse, crenate, shallowly pinnately lobed; base attenuate. *Flowers* pale mauve, turning purple, racemose. *Calyx* sub-campanulate, hirsute; segments ovate, crenate. *Corolla* lobes oblong-ovate, ciliate. *Filaments* glabrate. *Ovary* ovate; stigma exserted. *Capsule* ·5 in. long, oblique, ovate, acuminate. *Seeds* somewhat blackish, distinctly reticulate.

LUSHAI HILLS (N. E. Parry 340). 5,000 ft.

P. gibbera *Prain.*

A herb, glabrate, rhizomate. *Leaves* small, ·4 by ·2 in., ovate, pinnatipartite; petiole ·5-1·5 in. long. *Flowers* purple. *Racemes* few

flowered; bracts foliaceous. *Calyx* campanulate; segments 5 *Corolla* lobes rotundate *Stamens* inserted on the middle of the corolla tube; filament barbellate. *Ovary* lanceolate; stigma included. *Capsule* ·35 in. long, oblique, lanceolate, acute. *Seeds* ovate; testa somewhat blackish, minutely punctulate.

Delai Valley (F. Kingdon Ward 8637). 11-12,000 ft.

Flrs. 8.

Calceolaria mexicana *Benth.*

A herb *Leaves* opposite, incised or sometimes very deeply, even pinnatifid, pubescent, pale green above; whitish beneath. *Flowers* usually solitary, axillary. *Corolla* yellow, bilabiate; lower lip concave; bladder-like. *Stamen* filter or staminoidal.

A naturalised garden plant introduced from Mexico.

KHASI HILLS (Lake Garden). 5,000 ft.

Flrs. 5-7.

OROBANCHACEÆ.

Leafless herbs; roots parasites. *Flowers* few, bisexual; bracts scale-like. *Calyx* spatheceous or bilabiate of 4 or 5 free or connate segments. *Corolla* usually bilabiate, hypogynous, curved; throat villous. *Stamens* 4, didynamous, adnate to the corolla tube; anthers 1 or 2-celled, 1-cell often imperfect; cells often spurred at the base, dehiscence by apical pores or slits. *Disc* usually obscure or glandular or unilateral. *Ovary* of 2, rarely 3 connate carpels; ovules many or few on confluent parietal placentas. *Capsule* usually 1-celled; valves 2, rarely 3. *Seeds* many, minute; testa pitted or reticulate; albumen fleshy.

ÆGINETIA Linn.

Leafless herbs with simple or branched naked or scaly scapes or stems. *Calyx* spathaceous. *Corolla* lobes all broad, sub-equal, spreading. *Anther* cells unequal. *Capsule* particularly 2-valved.

Scapes long, more or less slender, naked; corolla purplish; palcenta multifid.	1. *A. indica.*
Scapes short, stout, bracteate; corolla tube mouth blue; placentas bi-lamellate.	2. *A. pedunculata.*

1. Æginetia indica *Roxb.*

Parasite herb of purplish colour, growing as root parasite on many plants. *Seeds* yellow, white.

KHASI & JAINTIA HILLS upto 5,000 ft.

Flrs. & Fr. 7-11.

2. Æginetia pedunculata *Wall.*

A reddish or yellowish leafless herb often parasite on the roots of grasses, with short underground stems. *Capsule* ovoid. *Seeds* brown.

KHASI & JAINTIA HILLS, 5,000 ft

Flrs. & Fr. 4-10.

Christisonia Hookeri *Clarke.*

A fleshy herb; stem 3-4 in. high, stout, glabrous. *Scales* truncate, lacerate. *Flowers* sessile; pedicels ebracteolate. *Calyx* pale violet, 1 in. *Corolla* 2-2·5 in. long, inclined; tube white, inflated; throat contracted. *Stamens* glabrous, included. *Ovary* 1-celled, placenta 2 partite.

KHASI HILLS (2-4,000 ft.). (*F.B.I.* IV. 321).

FAM. 95. LENTIBULARIACEÆ.

Herbs, aquatic or growing in wet places. *Leaves* rosulate or when submerged capillary multifid or obsolete, insectivorous. *Flowers* bisexual, irregular, usually in raceme or spike. *Calyx* inferior, 2-5 fid or partite, persistent in fruit. *Corolla* bilabiate; lower lip spurred. *Stamens* 2, epipetalous, attached to the base of the corolla; filaments curved; anthers transversely confluent, longitudinally dehiscing. *Ovary* 1-celled, globose; stigma 2-lobed; ovules many, usually anatropous on a free central placenta. *Capsule* 2-4 valved. *Seeds* exalbuminous.

Urticularia Wallichiana *Wight* and U. bifida *Linn.* (Flowers yellow) are recorded from KHASI HILLS.

Pinguicula alpina *Linn.*

Flowers white with a yellow spot on the throat.

Delai Valley 10,000 to 11,000 feet.

Flrs. 5.

FAM. 96. GESNERACEÆ.

Herbs or undershrubs, sometimes epiphytic, or rock plant. *Leaves* alternate, opposite, whorled or solitary, fleshy or coriaceous, entire or toothed, exstipulate. *Flowers* hermaphrodite, more or less zygomorphic, in axillary or terminal bracteate racemes, rarely cymose or solitary; bracteoles small. *Calyx* segments 5, valvate or open, rarely imbricate. *Corolla* tubular; lobes 5, imbricate in bud. *Stamens* on the tube usually didynamous, sometimes 5, often only 2 perfect; anthers 2-celled or cells confluent. *Disc* annular, cylindric or 0. *Ovary* 1 or imperfectly 2-celled; style linear; stigma small, capitate or 2-lobed; ovules many, anatropous; placentas parietal, 2-fid. *Fruit* capsular or baccate, dehiscent or indehiscent. *Seeds* numerous, minute; albumen 0 or scanty; embryo straight.

Seeds more or less hairy :—
- Fruit capsular, dehiscent :—
  - Leaves fleshy. Stamens 4, perfect, exserted, epiphytic undershrubs. .. .. **1. Æschynanthus.**
  - Leaves sub-coriaceous. Stamens 2, perfect, included. .. .. **2. Lysionotus.**
  - Leaves membranous. Stamens 4, perfect, included. .. .. **3. Loxostigma.**

Seeds without hairs :—
- Fruit dehiscent :—
  - Corolla funnel-shaped :—
    - Stamens 4, perfect. Capsule 2-valved. **4. Didissandra.**
    - Stamens 2, perfect :—
      - Capsule sub-follicular, 4-valved; stigma entire, oblique. .. .. .. **5. Didymocarpus.**
      - Capsule 2-valved; stigma bifid. .. **6. Chirita.**
  - Corolla shortly campanulate :—
    - Stamens 2. Capsule twisted. .. .. **7. Bœa.**
    - Stamens 4. Capsule linear-cylindric. .. **8. Bœica.**
  - Corolla bilabiate; tube narrowed at mouth. Stamens 2 Capsule ellipsoid. .. .. **9. Rhynchoglossum.**
  - Corolla bilabiate; tube straight. Stamens 4. Capsule globose, circumsciss. .. **10. Epithema.**
  - Corolla campanulate, obscurely bilabiate. Fruit splitting irregular. .. .. **11. Rhynchotechum.**

1. ÆSCHYNANTHUS Jack.

Epiphytic undershrubs or rock plant with slender erect or creeping stems, often rooting at the nodes. *Leaves* opposite, fleshy or leathery, usually entire; nerves more or less obscure. *Flowers* 5-merous, often showy in terminal or axillary fascicles, rarely solitary. *Calyx* sub-entire or more or less partite or fid. *Corolla* tubular, curved, dilated above more or less bilabiate. *Stamens* on the corolla tube didynamous, 4 perfect; anthers usually exserted, connivent in pairs *Disc* annular or shortly cup-shaped. *Ovary* superior, stipitate; stigma dilated or peltate; ovules many. *Capsule* long, linear, loculicidally 2-valved. *Seeds* numerous, minute with 1 or more hairs at the end near the hilum and 1 at the apex, exalbuminous; cotyledons very small.

Seeds with 2 hairs near the hilum and one at the apex :—		
Calyx about 7 in. Corolla 1 in. long, red-orange; lobes dark-spotted. Ovary glabrous.	1.	*Æ. Hookeri.*
Calyx about ·5 in. Corolla about 2 in., scarlet orange with dark purple longitudinal stripes behind each lobe and triangular blotch; anthers uniform.	2.	*Æ. grandiflora.*
Calyx about ·25 in. Corolla not exceeding ·75 in.	3.	*Æ. maculata.*
Seeds with one hair not dilated at the base and one at the apex :—		
Calyx deeply fid; segments lanceolate, acute or linear; filaments glandular, hairy, glabrous except the flowers. Leaves 2-4 by ·6-1·2 in.	4.	*Æ. micrantha.*
Branches hairy. Leaves ·4-·8 by ·2-·3 in.	5	*Æ. gracilis.*
Branches thickly pubescent. Leaves 1-1·3 by ·4-·5 in.	6.	*Æ. Mannii.*
Calyx segments wide, obtuse or large :—		
Calyx segments persistent. Corolla ·5 in., yellow-green.	7.	*Æ. acuminata.*
Calyx segments deciduous. Corolla 1·3 in., scarlet.	8.	*Æ. bracteata.*
Calyx segments deciduous. Corolla 2·25 in., rosy.	9.	*Æ. superba.*

1. Æschynanthus Hookeri *Clarke.*

An epiphyte. *Leaves* 2-4 by ·5-·8 in., narrow lanceolate, acuminate, fleshy; midrib stout beneath; base cuneate;

petiole ·25 in. long. *Flowers* in terminal umbles. *Calyx* purple red. *Corolla* 1 in., hairy outside; the lobes black spotted. *Filaments* exserted. *Ovary* glabrous; style glandular, hairy. *Capsule* about 8 by ·16 in. *Seeds* minute, tubercled; the hairs at the hilum about 1·25 in. long, near the apex about 1 in. long.

KHASI HILLS (4,000 ft.).

Flrs 8. Fr. 8-1

2. Æschynanthus grandiflora *Spreng.* Vern. *Tiw-rishen,* Synt.; *Tiw-ri-seinrit,* Kh.

An epiphyte, glabrous. *Leaves* 2-5 by ·5-1·5 in., lanceolate, acuminate, undulate, fleshy, glabrous; base cuneate; petiole ·3-·6 in. long. *Flowers* about 2 in. long, in terminal clusters. *Calyx* greenish-white, foliaceous, veined glabrous, about ·5 in. long; segments lanceolate, acute. *Corolla* inflated upwards, outside puberulous, orange-scarlet with dark purplish longitudinal stripes outside and triangular blotch on the inner face. *Filaments* very much exserted, hairy. *Capsule* upto 15 in. long.

N. C. HILLS, KHASI HILLS.

Flrs. 9. Fr. Cold season.

3. Æschynanthus maculata *Lindl.*

Epiphytic. *Leaves* 1·5-4 by ·5-1 ½ in., lanceolate, acuminate, fleshy, glabrous; base acute or cuneate; petiole ·1-·3 in. long. *Flowers* 1·2 in. long, clustered, often capitate. *Calyx* puberulous, very deeply divided; segments rather linear, acute, ·2 in. long. *Corolla* narrow. *Anthers* rather shortly exserted, each pair confluently connate about the back. *Style* short or exserted. *Capsule* 9-10 in. long.

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

Flrs. 6-7. Fr. 11.

4. Æschynanthus micrantha *Clarke.* Vern. *Tewkynjiri,* Kh.

Epiphyte, glabrous, drying purplish stain. *Leaves* 2-4 by ·5-1·5 in., elliptic-lanceolate, acuminate, fleshy, glabrous; base acute or rounded; petiole ·2-·6 in. long. *Flowers* about 2 in. long, terminal or lateral in clusters; pedicels ·4-·6 in long. *Calyx* glabrate; segments linear-lanceolate, ·5 in. long. *Corolla* brick red. *Filaments* exserted. *Capsule* 5-6 by ·12 in., shallowly channelled. *Seeds* with 1 hair at either end.

N. C. HILLS, KHASI HILLS (2,500 ft.).

Fr. 11-2.

5. Æschynanthus gracilis *Parish.*

An epiphyte; branches hairy, slender, elongate, rooting. *Leaves* ·4-·8 by ·2-·3 in., lanceolate or obovate, acute, sub-coriaceous, pubescent; base acute or rounded; petiole ·05-·8 in. long. *Flowers* scattered. *Calyx* puberulous, ·25 in.; segments linear-lanceolate, acute. *Corolla* ·8 in., scarlet, villous without. *Filaments* exserted, obscurely glandular hairy. *Capsule* upto 5 in. long.

N. E. F. TRACT, Upper Dehing Reserve, KHASI HILLS, CACHAR (upto 4,000 ft.).

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

6. Æschynanthus Mannii *Kurz.*

An epiphyte; branches pubescent. *Leaves* ·8-1·2 by ·3-·5 in., elliptic, bluntly acute, sub-coriaceous, fairly pubescent; base bluntly acute or rounded; petiole ·05 in. long. *Flowers* axillary, solitary or in pairs. *Calyx* pubescent, ·2 in. long; segments acute. *Corolla* ·7 in. long, pubescent outside; tube ·4 in. long, widening upwards, funnel-shaped; lobes broadly obtuse. *Filaments* exserted, sparingly hairy.

GARO HILLS.

Flrs. 4.

7. Æschynanthus acuminata *Wall.*

Leaves 2-4 by ·8-1·5 in., elliptic-acuminate, coriaceous, glabrous; lateral nerves conspicuous about 6 on either half; base narrowed into the petiole, which is ·1-·3 in. long. *Flowers* in small clusters, sub-fasciculate, few flowered. *Calyx* broad, deeply divided; segments ·2 in., persistent. *Corolla* ·5 in., wide, tubular, straight, upper lip green *Stamens* much exserted, glandular hairy. *Capsule* 6-8 by ·1 in.

LAKHIMPUR, GOALPARA, DARRANG, NAGA HILLS, KHASI HILLS.

Flrs. 10-12. Fr 1-3.

8. Æschynanthus bracteata *Wall.* Vern. *Tiw-la-padong*, Kh.

An epiphyte, glabrous. *Leaves* 2·5-4·5 by 1-1·8 in., elliptic, oblong-elliptic, acuminate, coriaceous, glabrous, paler beneath; lateral nerves about 7 on either half, oblique, unequal, more or less conspicuous beneath; base cuneate or rounded; petiole ·3-·7 in. long. *Flowers* usually in terminal clusters; peduncles ·75 in. long; bracteoles red, about 8 in. long, broad, ovate, acute, not persistent. *Calyx* scarlet, divided nearly to the base; segments ·6 in. long. *Corolla* tubular, widening upwards, 1·5 in. long, scarlet. *Filaments* exserted, glandular hairy. *Capsule* 4-6.

MANIPUR, KHASI HILLS 6,000 ft.

Flrs. & Fr. 8-11.

9. Æschynanthus superba *Clarke.* Vern.. *Thylli-masi*, Kh.

Epiphytic on trees or rock plants, often scandent; branches stout, woody, thickened at the joints. *Leaves* 4-8 by 1·5-2·5 in., elliptic-lanceolate, elliptic-oblong, acuminate, undulate, fleshy, glabrous; midrib very stout and prominent beneath; base cuneate or rounded; petiole ·2-·5 in. long. *Flowers* reddish, umbellate, terminal or no spurs of old wood;

peduncles ·8 in. long; pedicels ·5 in. long; bracts 1·8 by ·8 in., veined, reddish, deciduous. *Calyx* reddish; segments thin, oblong-obtuse, 1 in. long. *Corolla* 2·5 in. long; tube with longitudinal ribs of darker red, and lobes with patchy darker stripes. *Filaments* exserted, minutely glandular hairy. *Capsule* upto 18 by ·12 in.

KHASI HILLS, 4,000 ft.

Flrs. 8-10. Fr. 11-1.

Æ. sikkimensis *Stapf. Tab. 8938, Curtis B. Magazine, 1922, Vol. CXLVIII.*

An epiphytic undershrub; branches pendulous, glabrous. *Leaves* 2·4-6 by ·8-1·6 in., oblong-lanceolate, caudate or acuminate, entire or very obscurely toothed, fleshy, leathery, pale green, glabrous; lateral nerves about 5 on either side, inconspicuous, oblique; midrib stout. *Cymes* axillary and terminal, much contracted upto with 6 rarely more flowers; bracts linear to awl-shaped, ·16 in. long; pedicels slender. *Calyx* 5-toothed; tube narrowly cylindric or wider upwards ·11 in. long; teeth as long as the tube or slightly shorter, very narrow linear-lanceolate or almost awl-shaped. *Corolla* curved, funnel-shaped, narrowed at the base, about 1-1·2 in. long, ·24-·28 in., wide at the mouth, with short almost equal rounded lobes ·07 in. long, scarlet with short glandular hairs, outside more yellow and glabrous; lobes marked with black decurrent streaks. *Stamens* shortly exserted; filaments with short glandular hairs; anthers purplish. *Ovary* linear, immersed at the base in cup-shaped disk, much shorter than the corolla, ultimately exserted from it, the upper part with glandular hairs. *Capsule* linear, narrowed at both ends, stalked, curved, upto 6 in. long. *Seed* oblong, almost ·04 in. long; testa wrinkled with 2 hairs at the base and 1 at other ends, hairs ·8-1 in. long, and 1·2-1·6 in. long, respectively.

KHASI HILLS, (Hooker & Thompson 9-1800 m.).

Æ. deleinsis *C. E. C. Fischer.*

A slender epiphyte; branchlets pale brown, glabrous. *Leaves* 2·5 by 1·2 in., broadly lanceolate, bluntly acuminate, coriaceous, glabrous; base acute; petiole ·4 in. long. *Flowers* scarlet with a short stripe down each lobe, solitary, axillary; pedicels slender, subtended by 3-4 linear, ensiform bracts. *Calyx* ·4 in. long; tube narrowly campanulate; lobes linear-ensiform. *Corolla* tubular, ventricose, 2·1 in. long; mouth oblique; lobes sub-equal, broadly rounded. *Stamens* exserted; filaments flat, glabrous below, hairy above; anthers cohering in pairs at the apex, disc annular. *Capsule* 7·2 in. long, linear, glab-

rous; valves everted and complicate after dehiscence. *Seeds* oblong, granulate.

Delai Valley (Kingdon Ward, 8447) 5,000 ft. (Kew Bulletin 1935, p 320).

Flrs. 5.

Æ. lenearifolia *C. E. C. Fischer.* (Kew Bulletin 1935, p. 321).

An epiphyte, glabrous. *Leaves* 4·1 by ·4 in., linear, oblanceolate, bluntly acuminate; midrib impressed above, prominent beneath; base obtuse; petiole ·3 in. long, channelled above, rugulose. *Flowers* terminal or axillary; peduncles solitary or fascicled. *Calyx* scarlet (F. K. Ward); segments ·8 in., sub-equal, ligulate or linear-lanceolate, obtuse or sub-acute. *Corolla* "upper half almost scarlet; lower half bright yellow," tubular; lobes sub-equal, broadly oblong, rounded. *Stamens* inserted about the middle of the corolla tube; filaments beset with gland-tipped hairs towards the apex; anthers sub-cordate, cohering in pairs by the apex *Fruit* 3·5 in. long, linear, curved.

Delai Valley (F K. Ward, 8470). (Kew Bulletin 1935, p. 321).

Flrs. 7.

2. LYSIONOTUS D. Don.

Epiphytic shrubs, glabrous. *Leaves* opposite or whorled. *Flowers* on many flowered peduncled cymes. *Calyx* segments lanceolate. *Corolla* tubular, dilated at the middle, bilabiate. *Stamens* 2, perfect; anthers connivent, connective appendaged. *Disc* annular. *Ovary* superior, stipitate; stigma shortly bilobed. *Capsule* linear, dehiscing loculicidally into 2-valves. *Seeds* small with a hair at the apex.

Leaves closely serrate or sinuate, herbaceous; nerves prominent, oblique.	1	*L. serrata.*
Leaves entire or minutely crenate towards the apex; nerves obscure, at right angles to the midrib, coriaceous.	2	*L. canferta.*

1. Lysionotus serrata *D. Don.*

An erect or sub-erect shrub, epiphytic on trees or rock plant, upto 28 in. in height; stem glabrous. *Leaves* 2-5 by ·5-1·3 in., elliptic to narrow-lanceolate, often ternate, closely serrate or sinuate, acuminate, herbaceous; lateral

nerves conspicuous, oblique; base often oblique, cuneate; petiole ·5 in. long. *Peduncle* ·3-·7 in. long; bracts ·3 in., ovate. *Calyx* segments ·25 in. long, often enlarged in fruit upto ·5 in. *Corolla* 1·4 in., purple with darker veins. *Capsule* 3-4 in. long, with a filiform funicle and an apical hair.

MANIPUR, KHASI HILLS, (4,000 ft.).

Flrs. 7-8. Fr. Cold season.

2. Lysionotus conferta *Clarke.*

Leaves elliptic-acuminate, sub-entire or obscurely crenate at the apex, coriaceous; lateral nerves obscure at right angles to the midrib; peduncles and capsules nearly allied to *L. serrata*. *Flowers* not seen.

Imperfectly known.

S. E. ASSAM, PATKAI HILLS. (Kew No. 3819). (*F. B. I.* 344 IV).

3. LOXOSTIGMA Clarke.

Loxostigma Griffithii *Clarke.*

A shrub 10-15 ft. high and 9 in. girth, but generally an undershrub 3-4 ft. high. *Leaves* opposite, 2-4·5 by ·5-1·5 in., elliptic or sub-falcate, finely serrate, acuminate-membranous, puberulous above, thinly pubescent, paler beneath; lateral nerves 8-10 on either half, slender but conspicuous below; base cuneate or acute, often unequal; petiole upto 1·2 in. long, pubescent. *Flowers* in lax peduncled cymes; peduncles slender, long; pedicels filiform, ·5-1 in. long. *Calyx* divided to the base; segments 5, lanceolate, ·15 in. *Corolla* 1·7 in. long, ventricose, bilabiate, pale yellow, pubescent outside, glabrous and with brownish purple dots and blotches inside. *Stamens* 4, didynamous, included; anthers 2-celled, connivent in pairs. *Ovary* shortly stipitate. *Capsule* loculicidal for the whole length, about 1 in. long, crowned with the persistent style; placenta

revolute, covering the seeds. *Seeds* pendulous; funicle capillary with a single hair at the apex.

KHASI & JAINTIA HILLS, (2,000 ft.).

Fr. 12.

4. DIDISSANDRA Clarke.

Didissandra lanuginosa *Clarke.*

A scapose perennial; stem hardly any. *Leaves* 1·5-2·75 by 1-1·5 in., crowded, ovate, sub-orbicular or elliptic, crenate, obtuse, sparingly hirsute above, mottled hairy beneath; base attenuated; petiole about 1 in. *Scape* thinly hairy upto 3-6 in. long. *Flowers* light purplish, ·4 in. long. *Stamens* 4, fertile; anthers peltate, cohering in pairs. *Ovary* glabrous. *Capsule* linear, ·7-·9 in. long, somewhat grooved, beaked, often curved.

KHASI HILLS, 4,000 ft.

Flrs 8.

5. DIDYMOCARPUS Wall.

Herbs or undershrubs. *Leaves* opposite or alternate or ternate, simple, exstipulate. *Flowers* in axillary pedunculate cymes. *Calyx* 5-fid or partite. *Corolla* infundibuliform; lobes 5, rounded, mouth oblique or sub-symmetric, often bilabiate. *Stamens* 2, perfect, 2-3-staminodes; filament filiform; anthers cohering in pairs; cells ovate. *Ovary* stipitate or sessile, narrow; stigma oblique, peltate or unilateral, rarely 2-lobed. *Capsule* linear, loculicidal, 2-valved or sub-follicular, ultimately often 4-valved, bearing the placenta on the valves. *Seeds* ellipsoid, minutely reticulate.

A genus of no forest importance.

D. punduana *Wall* Stem 8-10 in., pubescent. *Leaves* 2-8 by 1-4 in., oblong, coriaceous, pubescent above, glabrate beneath; petiole upto ·2 in. long. *Inflorescence* large, about 7 in. across. *Corolla* 1 in. long. *Capsule* upto 1·7 in long.

KHASI HILLS, 5,000 ft.

Flrs. 7-9. Fr. 10.

D. Hookeri *Clarke*. Stem upto 16 in., villous. *Leaves* 2-6 by ·8-3·5 in., ovate or sub-orbicular, pubescent above, puberulous beneath, specially along the nerves; petiole upto 4 in. *Inflorescence* smaller, about 3 in. across. *Corolla* ·6 in. long, pubescent. *Capsule* upto 1·2 in. long.

KHASI HILLS 6,000 ft.

Flrs. 8-9. Fr. 10.

D. acuminata *Br.* Stem upto 6 in., hairy. *Leaves* ovate, larger than the above species (upto 10 by 6 in.), glabrous beneath.

KHASI HILLS.

D. adenocarp *Fischer*. A low herb. *Leaves* 3·6-6 by 2-3·2 in., all caulescent, membranous, often unequal, oblong-acute or abruptly acute, cuspidate; base shallow-cordate.

LUSHAI HILLS.

6. CHIRITA Ham.

Chirita acuminata *Br.*

An herb, rather shrubby; stem simple. *Leaves* opposite, 4-10 by 1·5-6 in., ovate or elliptic, acuminate, closely serrulate or sub-entire, hairy on both surfaces, green paler beneath; lateral nerves 9-12 on either half, sub-parallel, oblique; petiole ·5-3 in. long. *Flowers* in axillary many flowered cymes. *Calyx* 5-fid. *Corolla* ·2 in., funnel-shaped, 5-lobed, bilabiate. *Stamens* 2, purple. *Staminodes* 2-3; anthers usually applied to the stigma; cells divaricate. *Ovary* linear; stigma peltate, oblique, notched on lower margins, bifid with age. *Capsule* 2-3 by ·13 in. *Seeds* ellipsoid, minutely imbricate, obscurely ribbed and minutely reticulate.

KHASI HILLS (4,000 ft.).

Flrs. 8. Fr. 11-4.

C. mishmiensis *Debbarman* ex *Biswas*.

A low herb. *Roots* fibrous. *Root-stock* very small with leaves developing more or less from the base. *Leaves* rather aggregate, elliptic-oblong, 4-8 in. long, 1·2-1·5 in. broad, margins crenate-serrate, chartaceous, acute at the apices, cuneate at the base, but not oblique, sericeo-tomentose on the upper green surface, densely adpressed woolly beneath; hairs on the lower surface, especially along the midrib fulvous or pale brown; midrib and 8-10 lateral nerves on either side of the lamina obscure; petiole ·8-1·5 in. long; peduncles slender, uniflorate, ·8-·12 in. long. *Calyx* ·6 in. in diameter, puberulous inside, 5-partite; segments ·25-·33 in. long, sub-equal, subulate. *Corolla* 2-2·5 in. long, ·4-·6 in. in diameter, yellow, minutely puberulous outside, sub-glabrous inside, 5-lobed; lobes about 2 in. long, and as much broad, sub-equal, round, purplish. *Stamens* 5, perfect, 2

connivent, sometimes abortive; filaments geniculate, glabrous below. barbate at the apices; anthers ovate, 2-celled *Ovary* linear, softly hairy; styles long, linear, tubulate, pubescent; stigma membranous, infundibuliform, unilateral, emarginate, smooth; ovules many, minute. *Capsule* not seen.

This new species could not be matched at Kew or at the Calcutta Herbarium. It is quite distinct in its characters but the two species which are to a certain extent allied to this new species are *C. brevipes* Clarke and *C. primulacea* Clarke. The former differs from *C. mishmiensis,* in its having leaves with petiole longer, lamina broadly elliptic and much more villous at the base, hairs deeply fulvous; peduncles longer and solitary; flowers comparatively much longer; calyx-lobes divided half way or sometimes nearly to the base. The latter in having single longer tap root, leaves with longer petiole, leaf-bases more cuneate, frequently oblique, margins compoundly crenate-serrate, hairs grey; inflorescence elongate, cymose; peduncles rather short but slender; calyx-lobes shorter, rarely divided half way down.

C. urticæfolia *C. B. Clarke.*

A herb rather shrubby, 1-2 ft. high. *Leaves* 4-5·5 by 1·5-3 in., broadly elliptic or obovate-elliptic, rather membranous; crenate serrate, acute, cuneate at the base, slightly oblique, hairy on the upper surface; lateral nerves, 7-10 on either half; petiole upto 2 in. long. *Peduncles* uniflorate, 1·5 in. long. *Calyx* ·4 in., puberulous; segments sub-equal. *Corolla* minutely puberulous outside towards lower half about 2 in. long, zygomorphic.

KHASI HILLS, Dumpep (10844).

Flrs. 9.

C. pumila *Don* & **C. macrophylla** *Wall.* also occur in KHASI HILLS.

7. BŒICA Clarke.

Undershrubs. *Leaves* alternate. *Flowers* small in axillary, lax-fid racemose or panicled cymes; bracts small. *Calyx* 5-fid or partite. *Corolla* tube short, obscurely bi-lobed, lobes subequal, rounded. *Stamens* 4; filaments short; anthers commonly 2-celled. *Ovary* sessile. *Capsule* 4-valved, linear, beaked by the style. *Seeds* small, smooth, ellipsoid.

A genus of no Forest importance.

Bœica filiformis *Clarke.*

Innovations nearly glabrous. *Leaves* 4-6 by 1-1·7 in., oblanceolate or obovate, elliptic-acuminate; lateral nerves about 9 on either half; base cuneate; petiole ·3-·9 in. long. *Peduncles* slender, 3 in. long or

more; pedicels and branches of inflorescence filiform, glabrous. *Capsule* ·5 in. long, glabrous.

LAKHIMPUR, CACHAR, KHASI HILLS & GARO HILLS.

Flrs. 2. Fr. 3-4.

B. Griffithii *Clarke*. Similar to B. filiformis. Innovations silky.

B. fulva *Clarke*. Similar to B. filoformis. Innovations woolly. (*F.B.I.*, 363, Vol. IV).

B. hirsuta *Clarke*. Leaves 7 by 2·5 in *Capsule* ·25 in., minutely hairy, 4-valved. (*F.B.I.*, 363 Vol. IV).

8. BŒA Commers.

Bœa multiflora *Br.*

A scapose perennial, woody; extremities pale brown, tomentose. *Leaves* crowded, 3-6 by 1-2 in., elliptic, crenate, acute, sub-coriaceous, glabrate above, tomentose beneath, specially on the nerves; lateral nerves 9-11 on neither half; tertiaries reticulate beneath; base cuneate; petiole ·3-·1 in. long. *Inflorescence* cymose; peduncles tomentose, many, 5-8 in. long. *Calyx* 5-fid. *Corolla* campanulate, distantly bilabiate. *Stamens* 2, perfect. *Ovary* sessile; stigma capitate. *Capsule* linear, about ·5 in.

KHASI HILLS (4,000 ft.)

Flrs. 7. Fr. 8-9.

9. RHYNCHOGLOSSUM Blume.

Rhynchoglossum obliquum *Blume.*

A tall succulent herb. *Leaves* 2-5 by 1-2·1 in., ovate-acuminate, membranous, almost glabrous; lateral nerves conspicuous, numerous, oblique. *Flowers* 5-merous in lax terminal racemes upto 10 in. long; bracteoles filiform. *Calyx* campanulate, cleft, enlarged in fruit. *Corolla* tube cylindric; limb bilabiate; upper lip short, 2-lobed; lower lip very much longer than the upper lip, sub-bilobed. *Stamens* 2, perfect; anthers connivent. *Ovary* ovoid; stigma dilated. *Capsule* included in the enlarged calyx, ellipsoid, membranous, loculicidally 2-valved. *Seeds* smooth.

KHASI HILLS (4,500 ft.).

Flrs. & Fr. 9-10.

10. EPITHEMA Blume.

Epithema carnosum *Benth.*

Small rock herb; pubescent. *Leaves* crenate, sinuate, pubescent. *Flowers* in long peduncled axillary scorpioid cymes; pedicels short. *Calyx* campanulate, ·13-·17 in., hairy; segments 5, acute. *Corolla* ·25-·35 in., tube short; lobes 5, bilabiate. *Stamens* 2, perfect, 2-staminoidal, shorter; anthers coherent. *Ovary* ovoid, pubescent at the apex; stigma sub-capitate. *Capsule* globose; ·09 in. in diameter. *Seeds* narrowly oblong.

KHASI & JAINTIA HILLS (2-3,000 ft.).

Flrs. 8.

11. RHYNCHOTECHUM Blume.

Shrubs or undershrubs; young parts tawny. *Leaves* opposite or alternate. *Flowers* numerous in axillary, trichotomous or umbellately compound cymes; bracts inconspicuous. *Calyx* 5-cleft; segments narrow. *Corolla* small, campanulate, bilabiate; lobes 5, subequal. *Stamens* 4, perfect, adnate to the base of the corolla; anther-cells 2, subparallel. *Ovary* sessile, ovoid. *Disc* small, annular or absent. *Berry* small, globose, apiculate, pulpy. *Seeds* smooth, very small.

Rhynchotechum ellipticum *A. DC.* Vern. *Jowpang-asing*, Miri; *Ja-kharia*, Kh.; *Dieng-ia-mahek*, Synt.

An erect undershrub 3-5 ft. high with thickened stem; young parts tomentose. *Leaves* opposite 5-13 by 1·5-5 in., broad-elliptic, abruptly acute, dentate, coriaceous, glabrate above, tomentose beneath, specially on the nerves; lateral nerves 14-20 on either half, almost parallel; base cuneate; petiole ·2-1·5 in. long. *Flowers* ·12-·16 in. across. *Inflorescence* usually from old wood. *Calyx* segments linear, scabrous, ·2 in. long, persistent. *Berry* ·2-·25 in. in diameter, whitish, juicy. *Seeds* very minute.

CACHAR, N. E. F. TRACT, KHASI HILLS.
Leaves are used as vegetable.

Flrs. 10. Fr. 2-3.

R. vestitum *Hk. f. & T.*

Stem 3-4 ft., extremities very hispid. *Leaves* 4-8 by 1·5-4 in., oblong; elliptic or obovate-elliptic, acuminate, sub-coriaceous, hirsute;

lateral nerves 9-13; base cuneate or narrowed into the petiole ·5-2 in. long. *Flowers* in axillary trichotomous corymbose and hirsute cymes. *Fruit* like pale glass beads supported by the hirsute calyx.

KHASI HILLS.

Flrs. 9-10. Fr. 11-12.

R. latifolium *Hk. f. & T.* R. alternifolium *Clarke* and R. calycinum *Clarke* are also recorded from the region of the Flora. (*F.B.I.*, p. 374. Vol. IV).

FAM. 97. BIGNONIACEÆ.

Trees and shrubs, often climbing. *Leaves* opposite, usually compound, exstipulate. *Flowers* bisexual, zygomorphic, often large and showy in racemes or panicles, usually terminal (sometimes solitary or clustered on the old wood). *Calyx* spathaceous or campanulate; segments 2-5, valvate. *Corolla* bilabiate, tubular-ventricose; lobes 5, subequal, usually imbricate. *Stamens* 4, didynamous (5th often present as a staminode, rarely perfect); anthers 2-celled, the cells parallel or divaricate. *Disc* usually conspicuous. *Ovary* 2-celled (Crescentia 1-celled); style long; stigmas 1 or 2-lobed; ovules numerous, erect, anatropous in axile placenta. *Fruit* a septicidal or loculicidal capsule. *Seeds* flattened or trigonous and with a large membranous wing, exalbuminous; cotyledon flat or folded.

Ovary 2-locular :—
- Perfect stamens 5 :—
  - Capsule septifragally dehiscent, very large, flat. Leaves 2-3-pinnate; tree. .. **1. Oroxylum.**
- Perfect stamens 4 :—
  - Capsule septifragally dehiscent, exotic climber with 2- or 3- foliolate leaves; flowers showy. .. .. .. **2. Bignonia.**
  - Capsule septicidally 2-valved; large climber; leaves opposite, 3-foliolate. .. **3. Nyctocalos.**

Capsule loculicidally 2-valved; calyx irregularly 3-5-lobed. Leaves large, 1-pinnate, tree. .. .. **4. Haplophragma. (Heterophragma.)**

Capsule elongate, terete, cylindric loculicidally 2-valved; calyx sharply lobed or truncate. Leaves large, 1-2 pinnate, tree. **5. Stereospermum.**

Capsule winged on both margins, oblong, loculicidally 2-valved; calyx large, ovoid, compressed. Leaves large, 1-pinnate. .. **6. Pahanelia.**

Ovary 1-locular :—

Perfect stamens 4 :—

Leaves alternate, simple. Flowers on old stem. Berries gourd-like; seeds not winged. .. .. **7. Crescentia.**

1. OROXYLUM Vent.

Oroxylum idicum *Vent* Vern. *Toguna, Bhatghila, Dingari,* Ass.; *Thikalong,* Kach.; *Tatola,* Nep.; *Napakbanarong,* Mik.; *Ja-rang-hon, Dieng-tit-kong-ling.* Kh.; *Kanaidinga,* Cach.; *Samba,* Manip.; *Polchang-kok,* Lushai; *Chaboi,* Tipp.; *Kharong-khandai,* Mech.; *Khiring,* Garo; *Naora,* Jharua; *Dieng-kawait-blai,* Synt.

A small tree with few branches and open crown; bark soft, light, brownish grey, corky outside. *Leaves* opposite, ternately bipinnate, 4-6 ft. long. *Leaflets* 3-4 by 1-3 in., broad-ovate, entire, acuminate, glabrous; petiolule ·1-·5 in. long. *Flowers* large, fleshy, purplish, in long terminal lax racemes; peduncle stout, 2-5 ft. long; pedicels 1-1·5 in. long. *Calyx* 1 by ·6 in., scarcely toothed, fleshy or coriaceous. *Corolla* campanulate; tubes green outside, 2-3 in. long and across; lobes dark red, imbricate. *Stamens* 5, all fertile; anther cells sub-parallel. *Disc* prominent. *Ovary* compressed; ovules numerous, many seriate in each cell. *Capsule* shortly stipitate, 1-3 by 2·5-3·5 in., scabbard-like. *Seeds* surrounded by a broad hyaline wing 2-3 in. across.

Common throughout the province.

Bark and fruit are used in tanning and dyeing. Root, bark, leaves and seeds are used in Hindu medicine Wood yellowish-white, weight 30 lbs. per c. ft. scarcely used, broad, fine.

Flrs. 6-8. Fr. Cold season.

2. BIGNONIA (Tourn.) L.

Bignonia magnifica *Bull in Gard. Chronicle.*

A handsome scandent shrub. *Leaves* compound, often 2-foliolate, the terminal leaflet is reduced to a spinescent growth or arrested tendril. *Leaflets* 1·5-4 by ·7-2·3 in., obovate-elliptic or broadly obovate, entire, obtuse, glabrous, 3-nerved at the base; petiole ·05-·2 in. long. *Flowers* large, zygomorphic, delicate, mauve to crimson in large stout pedunculate racemes; pedicels ·8 in. *Calyx* tubular, almost truncate, ·4 in. long. *Corolla* almost bilabiate, 5-lobed. *Stamens* 4, didynamous. *Fruit* not seen.

Dipling-SIBSAGAR (No. 3507 Kanjilal). Native of Columbia U. S. Flrs. 2.

3. NYCTOCALOS Teijsm & Binn.

Nyctocalos Thomsoni *Hook. f.* Bot. Mag. t. 5678.

A large glabrous climber. *Leaves* opposite, 3-foliolate; petiole 4 in.; leaflets 6 by 3 in., broadly elliptic, caudate-acuminate; petiolule ·5-2 in. long. *Peduncles* terminal, few flowered. *Calyx* teeth 5, linear. *Corolla* large, white with long tube (7 in.); lobes 5, round. *Stamens* attached near the top of the corolla tube. *Anthers* yellow; connective minutely mucronate; stigma sub-capitate, tongue-shaped. *Capsule* oblong, 6 by 2 in. septicidally 2-valved; valves almost woody. *Seeds* thinly discoid, surrounded by a hyaline wing.

Gauhati (Jenkins), Mikir Hills. (F.B.I., IV. 377).

4. HAPLOPHRAGMA P. Dop.

Haplophragma adenophyllum *P. Dop.*=Heterophragma adenophyllum Seem. Vern. *Dhopa-paruli,* Ass.; *Ziron,* Lushai; *Mostan-phul,* Cach.; *Lotum-poh,* Mik.

A fairly large tree. *Bark* grey, deeply furrowed in large trees, ·5 in. thick; blaze white, turning brown, fibrous, extremities mostly tomentose. *Leaves* 2-3 ft. long; leaflets 1-2 ft. long, variable, 4-11 by 2·5-5 in., elliptic, entire, acute, glabrous above, rusty pubescent beneath; lateral nerves prominent beneath, about 7 on either half, alternating with

the midrib; petiolule 0-·3 in. long. *Flowers* large, yellowish brown, in dense terminal tomentose panicles; bracts deciduous, ·5 in., lanceolate. *Calyx* upto 1 in., rusty-tomentose, campanulate, irregularly toothed. *Corolla* densely rusty-tomentose outside, mouth 2 in. across; lobes 5, sub-equal. *Stamens* 4, didynamous; anther-cells linear-oblong, divergent. *Disc* cushion-shaped. *Ovary* sessile, many seriate; stigma 2-lobed, cylindric, ribbed, twisted; ovules numerous. *Capsule* elongate, upto 3 ft. long, loculicidally 2-valved, twisted. *Seeds* 1 by ·5 in., compressed with a membranous wing on each side.

SIBSAGAR, LUSHAI HILLS, SYLHET, KAMRUP, NOWGONG, N. C. HILLS.

Wood yellowish, hard, well deserving of being better known, 42 lbs. per c. ft. Does not warp or split and should be very suitable for furniture and cabinet work. Bows are made of the timber.

Flrs. 3. Fr. Cold weather.

5. STEREOSPERMUM Cham.

Trees. *Leaves* opposite, imparipinnate. *Flowers* large, terminal, in ample lax panicles with decussate branching. *Calyx* campanulate, truncate or shortly and unequally lobed. *Corolla* curved, tubular-campanulate, bilabiate; lobes 5, sub-equal, imbricate, often crisped toothed or laciniate. *Stamens* 4, didynamous, included (with a rudimentary scar); anther-cells divaricate or divergent. *Disc* fleshy, more or less cupular. *Ovary* sessile, elongated, 2-celled; ovules numerous, biseriate in each cell; style slender; stigma 2. *Capsule* 4 angled or terete, loculicidally 2-valved; septum thick, corky, cylindrical, pitted in alternating cavities to receive the seeds, the somewhat membranous wings of which lie flat along it. *Seeds* compressed or sub-trigonous; cotyledons folded, radicle straight.

Leaves imparipinnate :—

Leaflets 7-11, elliptic, cordate-acuminate. Calyx shortly toothed. Capsules 12 in. or more.	1. *S. chelonoides.*
Leaflets 3-7, acute or acuminate. Calyx sub-truncate. Capsules 10 in. or less ..	2. *S. glandulosum.*
Leaves 2-pinnate. Calyx shortly bilabiate or sub-spathaceous. Corolla lobes crenulate. Capsules rusty coloured, 15 in. or more. ..	3. *S. hypostictum.*

1. Stereospermum chelonoides *DC.* Vern. *Mouserphang*, Kach.; *Serphang*, Mech.; *Bolsel*, Garo; *Paroli*, Ass.; *Ing-nge-ching*, Naga; *Dieng-phsiar*, Synt.; *Jinghal*, Lushai; *Awal*, Cach.; *Paraia-awal*, *Paroi*, Sylh.; *Miji*, Tipp.; *Inghet-arong*, Mik.; *Dieng-sir*, Kh.; *Parhori*, Nep.

A large deciduous tree; branches spreading. *Bark* yellowish grey, rough outside, longitudinally furrowed on old trees, 1 in. thick, exfoliating in thin concentric plates; outer plates comprising about ·75 in. deep, brown, hard; inner plates white and soft. *Leaves* imparipinnate, 12-18 in. long; leaflets 7-11, 2-7 by 1-3 in., often unequal sided, elliptic, elliptic-oblong, caudate-acuminate, entire or occasionally serrulate, coriaceous, glabrous; lateral nerves 8-10 on either half, distinct; midrib impressed above; petiolules ·2-·6 in. long. *Flowers* fragrant in lax terminal glabrous panicles; branching slender and articulate. *Calyx* purplish, campanulate, ·25 in. long, irregularly toothed. *Corolla* about 1 in. long, villous inside; the tube yellowish with purplish tinge and veined; lobes rounded, crisped. *Filaments* bearded at the base. *Capsule* 15-20 in., curved, compressed, obscurely 4-angular, more or less spirally twisted. *Seeds* 1 by ·2 in., with wings straight along the back also.

Throughout ASSAM ascending upto 4,000 ft.

The wood is fairly durable and is very good as an impregnate sleeper. Very hard for hand sawing, used for dugouts and small building works; weight 40 lbs. per c. ft

The leaves, roots and flowers have some repute in Hindu medicine.

Flrs. 4-6. Fr. Cold season.

2. Stereospermum glandulosum *Miq.*

A small tree; branches spreading. *Bark* whitish and corky outside, pale green beneath the thickish layer of cork with a few round warts; inside finely fibrous; concentric layers pale brown, turning dirty brown; branchlets lenticellate. *Leaves* imparipinnate, 15-20 in. long. *Leaflets* 3-7, 3·5-8 by 1-3·5 in., unequal sided, elliptic or lanceolate, elliptic-oblong, entire, acute or sharply acuminate, chartaceous, glabrous (with a tuft of white hairs at the base of the blade);

lateral nerves 7-11 on either half, distinct, slender; petiolule ·1-·6 in. long. *Flowers* white, tinged with pink, in few flowered terminal or sometimes axillary panicles; bracteoles caducous. *Calyx* red, persistent, ·2 in. long. *Corolla* 1·5 in., glabrous, cylindric below, campanulate above, pubescent within. *Staminode* clavate. *Disc* glabrous. *Capsule* slender; terete, smooth; valves thin, 8-10 in. long, papery. *Seeds* flat, ovate, ·12 in. broad including the wings, which are very membranous and silky.

N. CACHAR HILLS, LUSHAI HILLS.

Flrs. 2-3. Fr. 5.

3. Stereospermum hypostictum *Miq.* Vern. *Kawait-blai,* Synt.

A large tree. *Bark* greenish grey with vertical brown lenticels, ·5-·6 in. thick in very thin concentric layers; pale grey inside, turning to darker grey with distant bands of cellular tissue of dull white colour. *Branchlets* with prominent oblong lenticels and covered with minute grey scales. *Leaves* 2-3 pinnate, 2-3 ft. long; rachis channelled above; primary pinnæ 4-6 pairs, the first 3 pairs with one or 2 pairs of secondary pinnæ which are 3-5 foliolate. *Leaflets* 1-5 by ·5-1·5 in., elliptic or lanceolate, caudate-acuminate, entire, sub-coriaceous, punctate, shining and deep green above, paler beneath; lateral nerves 6-7 on either half; base rounded or attenuate; petiole ·05-·4 in. long, channelled above. *Flowers* white, tinged pinkish, in branched panicles. *Calyx* closed in the bud, bilabiate, and in flowers deciduous. *Corolla* ·2 in., cylindric below, campanulate above, glabrous; lobes rounded, crenulate. *Filaments* glandular-hairy below. *Ovary* oblong, flattened; stigma bilobed. *Capsule* 15 in., more or less torulose, valves thin. *Seeds* flat, concave, about ·12-·16 in. across; wings about ·3 by ·12 in., transparent, shining, dissepiment sub-terete with convex faces but with 2 ridges along the sides.

KHASI & JAINTIA HILLS ascending upto 4,000 ft.

Flrs. 5-6. Fr. Cold season.

6. PAJANELIA DC.

Pajanelia Rheedii *DC.* Vern. *Dieng-Tang-leng, Dieng-long-oh,* Kh.; *Horá, Kawarnoa,* Sylh.; *Totala,* Nep.; *Honur,* Cach.; *Baklong,* Tipp.

Tree not branched. *Bark* greyish brown with vertical lines of large blackish warts, rough outside, ·8 in. thick; inside light chocolate brown with coarse irregular white strands. *Leaves* imparipinnate, upto 3 ft. long; rachis terete with a sharp ridge on the vertical side; leaflets 3-9·5 by 1·5-4 in., opposite (21-25), ovate or ovate-elliptic, lanceolate, entire, acute or shortly acuminate, rather coriaceous, glabrous; lateral nerves slender, about 7 on either half; base oblique and unequal; petiolule 0-·3 in. long. *Flowers* large, 2-3 in. long, dark purplish, in robust terminal panicles upto 1·5 ft. long; pedicels thick, ·6 in. long. *Buds* inflated before opening. *Calyx* 1·1 in. long, tubular, irregularly 5-partite. ultimately deciduous. *Corolla* dull white, 2-3 in.; lobes 5, crisped, rounded, 1 in. long. *Stamens* 4. *Capsule* straight, flat, upto 18 by 3·25 in., glabrous, winged on both margins, which again are split and the capsule becomes 4-winged, septa flat. *Seeds* compressed, winged at both ends.

SYLHET, CACHAR, KHASI & JAINTIA HILLS upto 2,000 ft. Flrs. 12-2. Fr. 3-5.

7. CRESCENTIA L.

Crescentia cujete *Linn.* Vern. *Bilati-Bel,* Tipp. The Calabash Tree.

An exotic (from America) tree. *Leaves* 1-6 by ·5-2·5 in., simple, alternate, clustered, nearly sessile. *Flowers* greenish white in clusters on old wood. *Corolla* campanulate with dull purple lines. *Fruit* large, globose, baccate, gourd-like. *Seeds* not winged.

Cultivated, NATURAL or TROPICAL AMERICA, SYLHET (No. 7695 B. C. Sen Gupta).

Calabash is prepared from the woody epicarp after removal of the pulp.

Flrs. 11.

FAM. 98. PEDALINEACEÆ.

Herbs, rarely shrubs. *Leaves* opposite or the upper alternate; hairs glandular, deeply lobed or divided. *Flowers* zygomorphic, bisexual, solitary or in cymes. *Corolla* tubular-ventricose; lobes imbricate. *Stamens* 4, didynamous. *Ovary* usually 2-celled (rarely 1-celled) or 4-locular with false septa; style long; stigma bilobed; ovules few or many on axile placenta. *Fruit* capsular or drupaceous, sometimes with hook. *Seeds* wingless, albumen 0 or thin; embryo straight.

SESAMUM Linn.

Sesamum orientale *Linn.*=Sesamum indicum DC. Vern. *Til,* Beng. The ginger oil plant.

Erect annual, 1-3 ft., glandular. *Flowers* purplish or whitish, pubescent. *Stamens* 4, perfect, didynamous; ovules 2 in each cell. *Fruit* capsular, 1 in. long, oblong, bluntly 4-gonous.

Extensively cultivated, for the seeds (black, white and red). The oil is emollient, demulcent and laxative, used for cooking, and also as a hair oil, specially scented.

Flrs. 10-12. Fr. 12-1.

FAM. 99. ACANTHACEÆ.

Herbs or shrubs, rarely trees, sometimes climbing, usually with swollen joints. *Leaves* opposite, rarely alternate, simple, entire, exstipulate, sometimes lanceolate with cystolith. *Flowers* zygomorphic in spikes, cymes or racemes, sometimes panicled, rarely solitary with usually large persistent bracts and bracteoles. *Calyx* usually 5(-4) partite, rarely minute or multifid. *Corolla* 2-lipped or subequally 5-lobed, imbricate or twisted in bud. *Stamens* 4, sometimes didynamous or 2 inserted on the corolla tube, 1-3 staminodes frequently present; anthers 2- or 1- celled, the cells sometimes remote; pollen shows great variety of pollens and sculpture (Haines). *Disk* often conspicuous and nectariferous. *Ovary* superior, 2-celled with axile placenta; style long; stigma bifid; ovules 1-many in each cell. *Capsule* loculicidal, the valves often elastically recurved. *Seeds* ovoid or compressed, usually hard, attached (with the exception of a few genera) to upcurved elastic supports (retinacula) with pointed tips and usually exalbuminous.

Seeds not supported on retinacula :—
  Calyx minute, annular or 10-15-toothed; ovules 2 in each cell. Flowers usually large. Climber. .. .. .. **1. Thunbergia.**
  Calyx 5-partite. Stamens 4; ovules very many in each cell. Flowers small. Erect plant. .. .. **2. Staurogyne.**
Seeds supported on a retinacula. Corolla tube twisted to the left in bud :—
  Ovules 3-12 in each cell :—
    Corolla sub-equally 5-lobed :—
      Flowers clusters separate on cyme branches; anthers acuminate at apex. Capsule seed bearing throughout. .. **3. Æchmanthera.**
  Ovules 2 in each cell :—
    Capsule 4 or fewer seeded. Anthers muticous :—
      Corolla sub-equally 4-lobed; tube short, widened gradually from near the base. **4. Strobilanthes.**

Stamens 4 or 2. Corolla somewhat 2-lipped, long-slender. Stamens 2. .. **5. Eranthemum.**

Seeds on hardened curved retinacula; upper lip of corolla obsolete, lower 3-lobed; ovules 2 in each cell. Anterior filaments without an excurrent process. .. .. .. **6. Acanthus.**

Seeds supported on retinacula :—

Corolla lobes imbricate in bud :—

Ovules 3-10 in each cell. Capsule normally 4- or 6- seeded :—

Capsule compressed. Seeds ovoid, hardly compressed. Flowers minute, thyrsoid. .. .. .. **7. Andrographis.**

Capsule subterete. Seed much compressed :—

Corolla tube very slender, straight. Ovary pubescent. .. .. **8. Gymnostachyum.**

Corolla funnel-shaped, curved. Ovary glabrous. .. . .. **9. Phlogacanthus.**

Ovules 2 or nearly 1 in each cell :—

Corolla lobes 5, sub-equal. Anthers 2-celled :—

Calyx segments 4, 2 opposite, larger than the others. Stamens 2, perfect, others rudimentary. .. .. **10. Barleria.**

Calyx segments 5, sub-equal, all small :—

Stamens 4. Corolla tube long; limb widened. .. . .. **11. Mackaya.**

Stamens 2 :—

Corolla tube long, slender. .. **12. Pseuderanthemum.**

Corolla tube ventricose. .. **13. Codonacanthus.**

Corolla distinctly 2-lipped. Anthers 2-celled :—

Stamens 4 :—

Calyx deeply 4- or 5-partite. .. **14. Lepidagathis.**

Calyx 5-toothed, campanulate. .. **15. Phialacanthus.**

Stamens 2 :—

Placentas separating elastically from the base of the capsule upwards. Bracts usually clustered and involucrate. .. .. .. **16. Dicliptera.**

Placentas not separating elastically for the valves :—

Anther-cells placed one higher up than the other :—

Anther-cells with a minute white basal spur. .. .. **17. Justicia.**

Anther-cells not spurred at the base but apicular.	18.	**Adhatoda.**
Anther-cells muticous. Flowers clustered. Corolla white, long.	19.	**Rhinacanthus.**
Anther-cells parallel, sub-equal:—		
Bracts large. Corolla tube narrow, long.	20.	**Ecbolium.**
Bracts small. Corolla tube ovoid, inflated, constricted at the tip.	21.	**Sphinctacanthus.**

1. THUNBERGIA Linn. f.

Scandent shrub, rarely erect. *Leaves* palminerved, angled, often cordate or hastate. *Flowers* axillary or in racemes large or moderate sized; bracts leaf-like; bracteoles large, enclosing the flower buds. *Calyx* small, annular, usually 10-16 toothed or obscure. *Corolla* conspicuous, tube curved, ventricose, mouth oblique; lobes 5, round, twisted to the left in bud. *Stamens* 4, didynamous, inserted near the base of the corolla tube; anthers 2-celled; cells sometimes spurred at the base. *Disc* conspicuous, annular or cushion-like. *Ovary* 2-celled, 2-ovuled; style long; stigma funnel-shaped, 2-lobed or subacute or style bifid with capitate stigma. *Capsule* globose, suddenly narrowed into a flat hard sword-shaped beak. *Seeds* 2 in each cell, glabrous, often hollowed at the base. *No* retinacula.

Flowers bluish. Leaves 5-7 nerved. Calyx sub-entire.	1.	*T. glandiflora.*
Flowers orange-red. Leaves 3-5 nerved, reduced to a crenulate rim.	2.	*T. coccinea.*

1. Thunbergia grandiflora *Roxb.* Vern. *Tillienru,* Synt.; *Khakkhu,* Garo; *Kukua-loti,* Ass.; *Nong-nongarikang,* Mik.; *Dumangkhlong, Tumakhlung,* Kach.; *Thangwakoi,* Kuki; *Jermie-khnong, Syntew-jarmi-chankhnow,* Khasi; *Loyga,* Naga; *Dengkhakhlu,* Mech.

A large climber. *Leaves* 3-7 by 1·5-6 in., ovate or orbicular or lanceolate towards the extremity, sub-entire, often angularly toothed, membranous, scaberulous above, pubescent beneath, 5-7 nerved; lower leaves often deeply cordate; petiole upto 3·5 in. long. *Flowers* large, bluish, axillary from

the uppermost leaves or in dense flowered racemes; bracteoles conspicuous, elliptic, falcate, up to 1·5 in. long. *Calyx* subentire. *Corolla* 2-3 in. long. *Anthers* bearded, spurred. *Capsule* about 1·5 in. long, up-curved with 4-quetrous beak, thinly pubescent. *Seeds* dorsally compressed.

Common throughout the Province.
Leaves are eaten as vegetable.

Flrs. 4-7, sometimes also flowers up to beginning of cold weather. Fr. Cold weather.

2. Thunbergia coccinea *Wall.* Vern. *Sibe-tapung,* N.-E. F. Tract; *Chonga-lota,* Ass.; *Long-long,* Mik.

An extrorse profusely branched climber with long pendent branches. *Leaves* 3-7 by 1-3·5 in., lanceolate, elliptic or ovate-lanceolate, acuminate, entire, serrate or remotely toothed, rather membranous, glabrous, 3-5 nerved; base rounded or shallow cordate; petiole ·05-2 in. long. *Flowers,* usually fascicled at the nodes of lax elongated pendent racemes; bracteoles about 1 in. long, reddish. *Calyx* a minute rim. *Corolla* orange-red; lobes reflexed. *Capsule* about 2 in. long.

N E. F TRACT, LAKHIMPUR, SIBSAGAR, NOWGONG, MANIPUR, KHASI HILLS (upto 4,000 ft.).

Flrs. 9-11. Fr. 12-2.

Nelsonia campestris *Br.*

A diffuse herb; softly villous. *Leaves* sub-sessile, ·5-1·5 by ·3-·6 in., elliptic. *Flowers* bluish; sepals 4, unequal. *Corolla* tube inflated, constricted; bilabiate with 4 spreading lobes. *Stamens* 2. *Capsule* barren above; seeds globose, small, yellowish with brown granules.

GOALPARA.

Flrs. & Fr. 12-3.

2. STAUROGYNE Wall (Ebermaiera Nees.).

Straurogyne argentea *Wall.*

A common weed under dense forest with complete leaf canopy. *Leaves* usually entire, obtuse, thinly chartaceous,

1·5-4 by ·8-1·5 in., elliptic or oblong-punctate above, whitened beneath; lateral nerves 5-7 on either half; base rounded or acute; petiole ·5-1·5 in. long. *Flowers* in terminal or also axillary spikes; bracts foliaceous, 3-nerved, terminating in a bristle; bracteoles small. *Calyx* deeply divided; segments linear, awned. *Corolla* about ·6 in. long, pubescent; lobes 5, spreading, patent. *Stamens* 4, didynamous, included; filaments hairy; anthers with 2 separate muticous cells. *Disc* small. *Ovary* 2-celled; ovules numerous in each cell; style slender, bifid. *Capsule* oblong, about ·25 in. long. *Seeds* (15-30) in each cell, unripe glandular; hilum minute, hollowed, no retinacula; albumen thin.

KHASI & JAINTIA HILLS, SYLHET.

Flrs. 8. Fr. 12.

S. glauca *O. Ktze.*=**Ebermaiera glauca** Nees.

An erect herb, viscous pubescent. *Leaves* almost all or upper portion alternate, small, spathulate; petiole about ·2 in. long. *Flowers* purplish, striped (rose or yellow) sessile or sub-sessile in lax spikes; bracts narrow, spathulate; bracteole small, linear. *Calyx*-segments 4, sub-sessile, ·25 in. long. *Corolla* about ·3 in. long, straight, slightly pubescent. *Capsule* oblong, about ·25 in. long; seeds globose, not pitted.

AKA HILLS. (15,263), 1934.

S. Simonsii (*T. Anders*) *O. Ktze.*

A rather stout, short, erect, woody undershrub. *Leaves* 5-7 by 1·8-2·5 in., elliptic, entire, bluntly acute, glabrous, green above, pale whitish beneath; lateral nerves 8-10 on either half, prominent beneath and slightly pubescent; base cuneate; petiole upto 3 in. long, pubescent. *Flowers* pedicelled in dense panicled racemes; bracts linear. *Calyx* segments ·25-·5 in. long, almost glabrous outside. *Capsule* about ·25 in. long.

KHASI & JAINTIA HILLS (2,000-2,500 ft.). Borpani, Pangtung, Shella.

Flrs & Fr. 8-12.

S. polybotrya (*Nees.*) *O. Ktze.*, S. glutinosa (*Wall.*) *O. Ktze.*, S. paniculata (*Wall.*) *O. Ktze.* and S. thyrsoides (*Nees*) *O. Ktze.* are also recorded from the Province.

3. ÆCHMANTHERA Nees.

Shrubs. *Leaves* nearly entire or crenate, often viscid. *Flowers* in sessile clusters forming trichotomous or second panicle bracts linear; bracteoles smaller, linear. *Calyx* 5-partite; segments linear, sub-equal. *Corolla* tubular, suddenly widened near the middle, glabrous but with 2 hairy lines on the palate within; lobes 5, sub-equal, rounded, twisted to the left in bud. *Stamens* 4, didynamous, included, longer filaments shorter, glabrous; anthers 2-celled, cells muticous. *Ovary* densely hairy at the apex; ovules 4-6 in each cell; stigma large, simple, linear-lanceolate. *Capsule* narrow, oblong, 6-8 (sometimes 12) seeded. *Seeds* discoid, densely hairy or thicker, glabrous.

Connective not ex-current:—		
Seeds densely hairy (starting out when mature).	1.	*Æ. tomentosa.*
Connective ex-current:—		
Seeds thicker, glabrous.	2.	*Æ. leiosperma.*

1. Æchmanthera tomentosa *Nees.*

A small erect shrub, villous. *Leaves* 1·5-3·5 by ·6-2 in., elliptic or ovate-lanceolate, acute or acuminate, crenate, subcoriaceous, pubescent above with stiff nerves, pubescent or tomentose beneath; lateral nerves 10-16 on either half; base rounded, often unequal; petiole·5-1·5 in. long. *Calyx* ·4 in. long, glandular hairy. *Corolla* ·7-1 in. long. *Capsule* linear, pubescent, about ·5 in. long, retinacula hooked, strong.

K. & J. HILLS (upto 5,000 ft.).

Flrs. 8. Fr. Cold season.

Æ. tomentosa *Nees.* Var. gossypina Nees =Var. Wallichii F.B I.

Shrub 3-4 ft. in height; stem thickly fitted with white wool. *Leaves* 3-6 by 2-3·5 in., ovate, velvety tomentose, purplish when old; petiole 1-2 in. long.

K. & J. HILLS.

Flrs. 10-1. Fr. Cold season.

2. Æchmanthera leiosperma *Clarke.*

A small shrub, very hairy. *Leaves* 3 by 1·5 in., ovate or elliptic, acute, crenulate; base rounded; petiole ·5 in. long. *Flowers* in somewhat leafy panicles; bracts ·5 in., linear-ligulate; bracteoles small. *Calyx* segments sub-equal, very hairy. *Corolla* about 1 in. long. *Stamens* 4, didynamous, connective excurrent. *Capsule* ·3 in., 6-seeded.

K. & J. HILLS (3-4,000 ft.)—Clarke.

(No specimen in Forest Herbarium, Shillong—*F.B.I.* Vol. IV, p 429).

Micranthus oppositifolius *Wendl.*=Phalyopsis parviflora Willd.

An undershrub with creeping root-stock and angled branches; sometimes prostrate. *Leaves* in unequal pairs, 3·5 by 1·5 in., elliptic or ovate-acuminate, thinly hairy, lanceolate; base narrowed into a slender petiole. *Flowers* small, in dense terminal spikes, glandular, hairy; bracts imbricate; bracteoles absent. *Sepals* 5, one larger ovate, others smaller. *Corolla* white, ·3 in. long; tube slender; lobes contorted in bud. *Stamens* didynamous; anther-cells 2, parallel. *Style* long, hairy; ovules 2 in each cell. *Capsule* about ·2 in., 4-seeded; seeds ·06-·08 in. across.

GOALPARA, KHASI & JAINTIA HILLS.

Flrs. & Fr. 11-3.

4. STROBILANTHES Blume.

Shrubs, undershrubs or herbs, often gregarious, often flowering periodically and then dying off. *Leaves* opposite, often unequal, toothed or sub-entire, usually lanceolate as are the bracts and other green parts. *Flowers* capitate or in strobilate or interrupted spikes or panicled sessile or sometimes pedicelled; bracts and bracteoles large, small or 0. *Calyx* usually deeply 5-fid; segments narrow, usually sub-equal, rarely 2-lipped. *Corolla* tubular-ventricose, straight or curved; lobes 5, sub-equal, rounded or ovate, contorted in bud. *Stamens* usually 4, didynamous or 2; anthers oblong, 2-celled, muticous. *Disc* small or prominent as a stipe of the ovary. *Ovary* 2-celled, 2-ovules in each cell; style linear; stigma of one linear branch, the other suppressed. *Capsule* 2- or 4- seeded, the placenta sometimes separating elastically. *Seeds* much compressed, glabrous or hairy (when wetted) on strong curved retinacula.

Stamens 2 :—

Seeds glabrous. .. .. .. *1. S. adnatus.*
Seeds hairy. .. .. *2. S. khasyanus.*

Stamens 4:—

Bracts persistent :—
Flowers capitate or shortly spicate:—
Seeds hairy:—
Bracts lanceolate, large, hairy:—
Leaves scabrous. Calyx-segments pubescent; petiole ·75 in. long. .. *3. S. scaber.*
Bracts obovate-oblong, incised, rufous-hairy:—
Leaves glabrous, lanceolate, denticulate. .. .. .. *4. S. fimbriatus.*
Bracts large, ovate, pectinate:—
Leaves hairy, serrate. .. .. *5. S. pectinatus.*
Bracts elliptic, crenate:—
Leaves shortly hairy, crenate. .. *6. S. Simonsii.*
Bracts ovate or elliptic, concave, entire:—
Leaves elliptic-acuminate, glabrate, almost entire. .. .. .. *7. S. glabratus.*
Bracts elliptic or elliptic-oblong, entire or toothed :—
Leaves ovate-acute, villous, serrate. *8. S. glomeratus.*

Flowers strobilate:—
Seeds hairy:—
Leaves auriculate, serrulate, sparsely hairy. .. .. *9. S. auriculatus.*
Leaves not auriculate:—
Ovary scarcely hairy. Leaves large; base cordate. .. .. .. *10. S. Sabinianus.*
Ovary hirsute. Leaves smaller; base rounded. .. .. .. *11. S. acrocephalus.*

Flowers in elongated spike, often much interrupted:—
Seeds hairy:—
Leaves nearly glabrous, sub-entire:—
Capsule large, about 1 in. long:—
Bracts obovate, crenate. .. .. *12. S. macrostegius.*
Capsule small, ·25 in. long or less:—
Bracts oblong. Corolla about ·6 in. *13. S. Brunonianus.*
Leaves denticulate:—
Capsule ·6 in. long:—
Bracts oblong, spathulate:—
Corolla white, yellowish, 1·4 in. long:—
Serrate:—
Bracts ovate, ·12-·25 in. long. *14. S. monadelphus.*

Serrate:—
Bracts obovate, spathulate:—
Corolla about 1·25 in. .. 15. *S. petiolaris.*

Leaves glabrous, serrate:—
Leaves lanceolate:—
Bracts small, linear, foliaceous:—
Corolla 1·17 in. .. .. .. 16. *S. tenax.*

Leaves ovate:—
Bracts oblong. Corolla scarcely ·7 in. .. .. 17. *S. maculatus.*

Leaves pubescent or hairy, remotely serrate:—
Bracts linear-lanceolate, 1-1·5 in. long. .. .. .. 18. *S. polythrix.*

Bracts caducous :—
Heads in fruit capitate (not interrupted) :—
Corolla more or less purplish :—
Corolla upto about 2 in. long:—
Bracts ovate, leaf-like, large :—
Corolla purple:—
Calyx-segments glandular:—
Lateral nerves 6-7 on either half. .. 19. *S. geniculatus.*

Bracts elliptic, small, concave:—
Calyx-segments fuscous-pubescent:—
Lateral nerves about 5 on either half. .. .. 20. *S. rhombifolius.*

Bracts lanceolate, membranous, small, ·39 in. long:—
Corolla pale violet:—
Calyx-segments glandular-pubescent. .. .. 21. *S. Burkilli.*

Corolla upto about 1·5 in. long:—
Bracts more or less orbicular, concave, whitened:—
Calyx-segments pubescent:—
Petiole ·1-·2 in. long. .. 22. *S. discolor.*

Corolla lavender:—
Corolla about 1 in.:—
Leaves opposite, subequal. .. .. 23. *S. isophyllus.*

Corolla about 1·25 in. long :—
Leaves pseudo-alternate, the opposite leaf of each pair much reduced or obsolete. .. 24. *S. anisophyllus.*

Heads in fruit elongate, interrupted below:—
Flowers distant:—
Bracts caducous:—
Corolla purple:—
Leaves sub-entire or toothed:—
Bracts ovate:—
Leaves lanceolate. Calyx segments glandular, pubescent. .. .. 25. *S. pauper.*
Leaves serrate:—
Leaves ovate:—
Leaves acuminate, small. Calyx segments glandular, pubescent. .. 26. *S. extensus.*
Leaves acute, larger. Calyx segments hairy. .. .. 27. *S. phyllocaulos.*
Leaves denticulate; bracts lanceolate :—
Leaves elliptic-acuminate. .. .. 28. *S. denticulatus.*
Leaves serrulate. Corolla tubular:—
Bracts obovate:—
Leaves ovate-acuminate. .. 29. *S. agrestis.*
Corolla yellow without, 1·5 in., minutely pubescent without:—
Spikes lax. .. .. .. 30. *S. secundus.*
Corolla pale lilac, 1·3 in. long, pilose:—
Inflorescence lax paniculate. .. .. 31. *S. arborasis.*
Corolla purple, 2 in., almost glabrous:—
Spikes dense panicles. .. .. 32. *S. flaccidifolius.*
Flowers mostly distant, alternate or paniculed :—
Bracts very small, ovate:—
Corolla purplish:—
Corolla about 1·5 in.:—
Leaves elliptic or lanceolate-serrulate, setulose. .. .. 33. *S. divaricatus.*
Corolla about 2 in.:—
Leaves oblong, sub-entirely hairy:—
Petiole ·16 in. long. .. .. 34. *S. rubescens.*
Leaves ovate-crenate, glabrate:—
Petiole 1-1·5 in. long. .. 35. *S. boerhavioides.*
Bracts linear:—
Corolla creamy white:—
Leaves lanceolate, sessile, glabrous. .. 36. *S. Helictus.*
Bracts lanceolate, persistent:—
Leaves broadly lanceolate, denticulate. 37. *S. Griffithianus.*
Leaves lanceolate, minutely serrate:—
Seeds orbicular. .. .. 38. *S. elongatus.*
Leaves elliptic-serrate:—
Seeds ovate. .. .. .. 39. *S. nobilis.*

Upper bracts leaf-like, ovate:—
Corolla ·5 in., pubescent without, persistent:—
Corolla curved:—
Leaves glabrous. .. .. *40.* *S. urophyllus.*
Upper bracts ovate or spathulate, persistent:—
Corolla 1 in., almost glabrous (hairy within):—
Corolla almost straight:—
Leaves pubescent. .. .. *41.* *S. stenophyllus.*
Bracts minute, persistent:—
Leaves rusty pubescent:—
Calyx segments sub-equal, pubescent:—
Corolla almost straight, puberulous. .. .. .. *42.* *S. Panichanga.*
Bracts elliptic, caducous:—
Leaves glabrous:—
Calyx segments sub-equal, glabrous:—
Corolla ventricose, glabrous. .. *43.* *S. coloratus.*

1. Strobilanthes adnatus *Clarke.*

An almost glabrous shrub. *Leaves* 4-8 by 1·5-3 in., broadly elliptic-acuminate, sub-entire, membranous, glabrous; lateral nerves about 10 on either half; base alternate; petiole ·8-1·25 in. long. *Flowers* in dense axillary or terminal panicled spikes, which are strobiliform. *Bracts* ·75 by ·3 in., scarious, ovate-acute, adnate, glabrous, ciliate, persistent, reticulate; bracteoles 0. *Calyx* small, about ·2 in.; segments linear. *Corolla* ·3-·5 in., glabrous without. *Stamens* 2, nearly glabrous, rudimentary stamens 2. *Capsule* ·3 in., 4-seeded. *Seeds* ovate, glistening, glabrous without lateral areolas.

UPPER ASSAM, NAGA HILLS, KHASI HILLS (5,000 ft.). (F.B.I., 436 Vol. IV).

Flrs. 4. Fr. 8-11.

2. Strobilanthes khasyanus *T. Anders.*

A densely brown hirsute shrub 2-4 ft. high, somewhat glandular-viscid. *Leaves* 4 by 2 in., ovate-acuminate, crenate or serrate, thinly coriaceous, hirsute; lateral

nerves about 9 on either half; base narrowed into the petiole; petiole 1·25 in. long. *Flowers* in linear-lax axillary clustered spikes (scarcely interrupted). *Bracts* narrow-spathulate, ·25-·3 in., linear. *Calyx* teeth ·25 in., linear, somewhat accrescent in fruit. *Corolla* slender, white; tube ·5 in., funnel-shaped towards the lip; lobes ·25-·3 in., reddish patent; filaments almost glabrous; anthers much exserted. *Capsule* ·3 in., 4-seeded. *Seeds* ovate with an areola on each side (not elastic when wetted).

KHASI HILLS upto 5,500 ft. (F B.I., 436 Vol. IV).

Flrs. 9. Fr. 1.

3. Strobilanthes scaber *Nees.* Vern. *Sam-siphra,* Garo.

A shrub upto 6-8 ft. high, gregarious; stem pubescent, joints much swollen. *Leaves* 3-5 by 1·5-2·5 in., elliptic-obovate, acuminate, crenate, scabrid, thinly coriaceous or glabrate on maturity; lateral nerves 6-8 on either half, subparallel, arcuate; base-cuneate; petiole ·6-1 in. *Flowers* yellow in hairy dense spikes, often clustered; bracts-lanceolate, green; bracteoles ·25 in., linear-oblong. *Calyx* glabrous; tube ventricose; lobes rounded. *Stamens* included; filaments hairy near the base. *Ovary* glandular at the apex; style almost glabrous. *Capsule* about ·5 in., 4-seeded. *Seeds* discoid, 1 in. in diameter, elastic when wet; areolas large, glabrous.

LAKHIMPUR (Dumardallong), KAMRUP, GARO HILLS, SYLHET (Wallich), KHASI HILLS.

Flowers are eaten cooked in Garo Hills.

Flrs. & Fr. 2-6.

4. Strobilanthes fimbriatus *Nees.*

Shrubby, glabrous. *Leaves* elliptic-oblong, acuminate, denticulate, sub-coriaceous, lanceolate; lateral nerves 7-8 on either half, slender; base acute or cuneate. *Flowers* in subsessile heads; bracts ·75 in., ovate-oblong, acuminate, inciso-serrate, rufous-hairy; bracteoles ·5 in., linear. *Corolla* 1-1·5

in., glabrous without. *Capsule* ·75-1 in. long, oblong, 4-seeded. *Seeds* ·2 in., ovate; areolas small.

SYLHET, KHASI HILLS. (F.B.I., p. 447 Vol. IV).
Flrs. 7.

5. Strobilanthes pectinatus *T. Anders.*

A large spreading gregarious shrub. *Leaves* 2·5-5 by 1-2·3 in., elliptic-acuminate, serrate, thinly coriaceous, sparsely hairy above, villous beneath, specially along the nerves; lateral nerves 6-8 on either half, sub-parallel, arcuate; base cuneate; petiole ·5-1·7 in. long, villous. *Flowers* in pedunculate hairy heads. *Bracts* large, ovate, ·75-1 in.; bracteoles linear. *Calyx* segments scarious, linear-glabrous. *Corolla* purplish, 1·5-2·5 in. long, funnel-shaped, almost glabrous; filaments hairy. *Capsule* ·5-·6 in. *Seeds* ·16 in., ovate; areolas small.

NAGA HILLS, KHASI HILLS (4,000 ft.).
Flrs. 5-9. Fr. 2.

6. Strobilanthes Simonsii *T. Anders.*

An undershrub; branches pubescent. *Leaves* 2-6 by 1-2 in., broadly lanceolate or elliptic-lanceolate, acuminate, arcuate-serrate, sub-coriaceous, minutely lanceolate; lateral nerves 7-9 on either half, slender; base-cuneate; petiole ·5-·9 in. long. *Flowers* in ellipsoid, puberulous heads; bracts about 1·2 in., elliptic, crenate, hairy; bracteole ·6 in. *Calyx* ·7 in. long, divided nearly to the base; segments linear-lanceolate, pubescent. *Corolla* about 2 in.; lobes unequal. *Capsule* ·9 in. long.

NAGA HILLS, LAKHIMPUR, SIBSAGAR (Mikir Hills).
Fr. 12.

7. Strobilanthes glabratus *Nees.*

A shrub 3-4 ft. high. *Leaves* 3-5 by 1-1·9 in., elliptic-acuminate, crenulate-undulate or sub-entire, membranous, glabrate; lateral nerves 6-8 on either half, arching; base narrowed into the petiole upto ·5 in. long. *Flowers* in ovoid-

pedunculate heads, usually glabrate; peduncles 1-2 in. long, angled or grooved. *Bracts* elliptic or ovate-elliptic, coriaceous in fruit. *Calyx* linear, scarious. *Corolla* bluish, 1-1·25 in., glabrous. *Capsule* ·75 in., broadly oblong, glabrous, 4-seeded. *Seeds* ·2 in., ovate; areolas small, hairy.

CACHAR (Prazer), KHASI HILLS (4,000 ft.).

Flrs. 4-5. Fr. Cold season (11).

8. Strobilanthes glomeratus *T. Anders.*

A gregarious shrub 2-5 ft. high; young branchlets horizontal, hairy *Leaves* 3-5 by 1·5-2·9 in., ovate or ovate-elliptic, acuminate, crenate or serrate, membranous, villous; lateral nerves 5-6 on either half; base narrowed into the petiole, usually unequal; petiole ·3-1 in. long. *Flowers* bluish, more in ovoid, sub-sessile, hairy heads. *Bracts* foliaceous, hairy, outermost pair serrate; bracteoles linear-lanceolate. *Calyx* ·5-·7 in.; segments linear-oblong, membranous. *Corolla* about 2 in. long; filaments sparsely hairy. *Capsule* ·75 in., broadly oblong, 4-seeded. *Seeds* ·16 in., silky hairy; areolas very small.

GARO HILLS (4,000 ft), N E F. TRACT, SYLHET, KHASI HILLS (4,000 ft.).

Flrs. 10-11. Fr. 12-1.

9. Strobilanthes auriculatus *Nees.*

A shrub 3-6 ft. high. *Branches* quadrangular, usually zigzag, pleasantly aromatic. *Leaves* very variable, sometimes upto 12 ft. long, 3-6 by 1·25-2·5 in., elliptic-lanceolate or elliptic-oblong, acuminate, serrulate, membranous, sparsely hairy above, specially along the nerves, glabrous beneath with numerous cystolith cells; lateral nerves usually 10-15 on either half, sub-parallel, arcuate, base auricled, sub-cordate, sessile. *Flowers* bluish in narrow hairy spikes 3-5 in. long. *Bracts* imbricating ·3-·6 in., obovate or obcordate, often recurved on fruit. *Calyx* segments ·25-·3 in., linear, softly tomentose. *Corolla* 1 in. long, upper portion campanulate, lower portion short, sparsely hairy; limb more or less bilabiate. *Stamens* almost glabrous. *Capsule* ·3 in., glabrous,

4-seeded. *Seeds* ·08 in., orbiculate, elastically hairy (white); areolas small.

KHASI HILLS, MANIPUR.

Flrs. 10-2. Fr. Hot season and rainy season ?

10. Strobilanthes Sabinianus *Nees.*

A shrub glabrous. *Leaves* 4-6 by 1·5-3·2 in., broadly elliptic to elliptic-lanceolate, acuminate, undulate or obscurely crenate, rather membranous lanceolate on both surfaces; lateral nerves 5-6 on either half, slender, oblique; base narrowed into the petiole or sometimes rounded; petiole ·1-·5 in. long. *Flowers* in pubescent spikes. *Bracts* ·3 by ·2 in., obovate or obcordate, pubescent; bracteoles ·25 in., lanceolate-pubescent. *Calyx* about ·5 in. long, deeply cleft; segments lanceolate, sub-verrucose, coriaceous. *Corolla* about 1·25 in., glabrous (Hooker), pilose without (Clarke), (I have seen only glabrous). *Capsule* ·3 in. long, pilose. *Seeds* 4, densely spinulate, orbicular, ·08 in.

KHASI HILLS (4,000 ft.).

Flrs. & Fr. 11-1.

11. Strobilanthes acrocephalus *T. Anders.*

An undershrub 2-3 ft. high, somewhat gregarious; young parts hirsute. *Leaves* 1-2 by ·5-1 in., ovate-acute, crenate, membranous, hirsute, specially along the nerves; lateral nerves 6-7 on either half; base rounded; petiole ·3-·5 in. long. *Flowers* bluish purple or mauve in solitary cylindric pedunculed spikes; peduncles hirsute. *Bracts* ·3-·5 in., ovate, margins ciliate; bracteoles oblong, spathulate. *Calyx* ·5 in.; segments oblong, hairy. *Corolla* about 1 in., glabrous; limb more or less bilabiate. *Stamens* glabrous. *Ovary* hirsute; style sparsely hairy. *Capsule* ·25 in., hairy, 4-seeded. *Seeds* ·08 in., orbicular, pubescent when young; areolas 0.

NAGA HILLS, KHASI HILLS (5,000 ft.).

Flrs. 9-1. Fr. 3.

12. Strobilanthes macrostegius *Clarke.*

A large shrub. *Leaves* 5-9 by 1-3·5 in., elliptic, elliptic-oblong, acuminate, sub-entire, coriaceous, lanceolate above,

sparsely hairy beneath, specially along the nerves; lateral nerves 9-12 on either half, prominent, arcuate; base cuneate; petiole 1-1·5 in. long. *Flowers* (in opposite pairs) in lax axillary spikes, scarcely interrupted. *Bracts* about 1 in., linear-acuminate; bracteoles ·6 in., cuspidate. *Calyx* ·7 in. long, deeply but sub-equally 5-cleft.; segments linear-glabrous, enlarged in fruit. *Corolla* pale purple, 1·5 in. long; lobes 5-notched. *Capsule* ·9-1·2 in. long, 4-seeded. *Seeds* ·2 in., ovate; areola obsolete.

N. E. F TRACT (Pasighat), KHASI HILLS.

Flrs. & Fr. 11-2

13. Strobilanthes Brunonianus *Nees.*

An erect dense shrub 2-3 ft. *Leaves* 2-4 by ·3-·4 in., lanceolate, sub-entire or undulate, crenate, acute, membranous, sparsely hispid above, glabrous beneath; nerves obscure; base alternate; petiole ·2-·4 in. long. *Flowers* bluish; spikes somewhat paniculate, usually interrupted towards the base. *Bracts* ·25-·3 in., oblong; bracteoles ·2 in., oblong. *Calyx* segments ·25 in. *Corolla* pubescent without, curved. *Stamens* glabrous. *Capsule* ·25 in., oblong, pubescent, 4-seeded. *Seeds* ·1 in., orbicular, pubescent; areolas 0.

NAGA HILLS, KHASI HILLS (4,000 ft.).

Flrs. 9-11. Fr 12-1.

14. Strobilanthes monadelphus *Nees.*

A rigid shrub; branches quadrangular, scaberulous. *Leaves* 2-4 by ·7-2 in., ovate, ovate-lanceolate, acuminate, serrate, sub-coriaceous, lanceolate and pubescent on both surfaces; lateral nerves 9-12 on either half, slender, prominent beneath; base narrowed into the petiole or cuneate; petiole ·3-1·5 in. long. *Bracts* ·12-·25 in., wide towards the base. *Seed* ·1 in. in diameter, pubescent allied to *S. maculatus*, specially in flowers and inflorescence.

K. & J. HILLS (4,000 ft.).

Flrs. 11.

15. Strobilanthes petiolaris *Nees.*

Shrubby, lax. *Leaves* ovate-acuminate, almost glabrous; base narrowed into the petiole; lateral nerves 7 on either half. *Flowers* in linear panicled hairy spikes; bracts obovate, spathulate. *Corolla* purplish or rose, 1·25 in. long, ventricose.

ASSAM (Griffith). (No specimen in Forest Herbarium, Shillong. F.B.I., IV. P. 458).

16. Strobilanthes tenax *Dunn.*

Leaves 3-4 in. long, lanceolate-acuminate, acute, serrate, glabrous, cystolith-linear; lateral nerves 6 on either half, prominent beneath; base acute, lower bases shortly petiolate, upper serrate. *Flowers* in lax panicle; bracts small, linear, foliaceous, persistent. *Calyx* ·4 in. long. *Corolla* tubular, 1·17 in. long; base ·1-·15 in. across; lobes 5, rounded, patent. *Stamens* 4. *Ovary* 4, ovulate. *Capsule* oblanceolate, ·59 in. long. *Seeds* 2.

N. E. F. TRACT (Kobo) (Burkill's No. 56785).

Flrs. 3.

17. Strobilanthes maculatus *Nees.*

A shrub. *Leaves* 4-6 by 1·4-3 in., ovate, ovate-lanceolate, acuminate, serrate, rather membranous, lanceolate on the upper surface; lateral nerves 9-11 on either half, slender; base alternate; petiole ·1-2·5 in. long. *Flowers* in terminal panicled hairy spikes, somewhat interrupted at the base. *Bracts* oblong. *Calyx* ·2-·3 in., 5-cleft; segments linear-oblong, unequal, hairy. *Corolla* blunt or lavender, about ·6 in. long, ventricose, somewhat curved; lobes roundish, reflexed. *Stamens* glabrous, 1-adelphous. *Capsule* ·25 in., oblong, pubescent, 4-seeded. *Seeds* ·05-·06 in. across, orbicular, shaggy with long hairs; areolas rather small.

KHASI HILLS (2,500 ft.). (F.B.I., p. 457 Vol. IV).

Flrs. 10-11.

18. Strobilanthes polythrix *T. Anders.*

A shrub, branches terete with patent long rufous hairs. *Leaves* 4-6·5 by 1·5-2·5 in., elliptic-acuminate, distantly serrate, sub-coriaceous, rufous hairy (more scattered above); base usually rounded; petiole ·5-1 in. long, rufous-hairy. *Flowers* in axillary sub-sessile, partly rufous-hairy spikes. *Bracts* 1-1·5 in., linear-lanceolate; bracteoles about ·7 in., linear, rufous-ciliate. *Calyx* deeply cleft; segments linear-lanceolate, rufous-ciliate. *Capsule* about ·8 in. long, linear-oblong, glabrous, 4-seeded. *Seeds* ovate, silky; areolas almost obsolete.

NAGA HILLS, KHASI HILLS.

Fr. 8.

19. Strobilanthes geniculatus *Clarke.*

A small shrub, glabrous. *Leaves* 2-5 by 1-1·6 in., elliptic-acuminate, serrate, rather coriaceous, glabrous; lateral nerves 6-8 on either half, slender; base acute, rounded or shallow cordate; petiole ·1-·2 in. long. *Flowers* in few flowered heads; peduncles 1-3 with a node carrying 2 reduced caducous leaves at the middle, they are geniculate and sometimes divided. *Bracts* large, ovate-acuminate. *Calyx* ·2-·3 in., deeply cleft; segments linear, unequal, glandulous, somewhat enlarged in fruit. *Corolla* purplish, 1·2-1·8 in. long, glabrous. *Capsule* ·5 in. long. *Seeds* ·1 in. long, ovate; areolas small.

MISHMI HILLS, N. E. F TRACT (Kolio, Pasighat), KHASI HILLS (4,000 ft.).

Flrs. & Fr. ?.

20. Strobilanthes rhombifolius *Clarke.*

A branched shrub. *Leaves* sub-sessile, often unequal, 3·5 by 2 in., rhomboid-ovate, acute, glabrous, remotely serrulate, lineolate on both surfaces; base acute; lateral nerves 5 on either half. *Peduncles* 1-3 headed; heads ·5 in. across; bracts small, elliptic, concave, caducous; brac-

teoles 0. *Calyx* divided nearly to the base, ·2-·3 in. *Corolla* 1·5 to 1·7 in. long, almost glabrous, purple mouthed.

ASSAM (Jenkins).

(No specimen in Forest Herbarium, Shillong. F.B.I., IV. P. 461).

21. Strobilanthes Burkilii *Dunn.*

A small shrub. *Leaves* 2·3-3·5 in., sub-sessile, oblong-lanceolate, acuminate, shortly dentate-serrate, cystoliths scarcely linear; lateral nerves 6 on either half, prominent beneath; base oblique, obtuse. *Flowers* capitate, peduncles slender, ·8-2 in. long; bracts lanceolate, ·4 in. long, membranous, glabrous, early caducous, cicatrix small, conspicuous. *Calyx* divided to base, linear-lanceolate. *Corolla* tubulose; lobes 5, rounded, ·08-·12 in. long. *Stamens* 4. *Ovary* 4-ovulate. *Capsule* oblanceolate, ·5 in. long. *Seeds* 2, rugulose, glabrous.

N. E. F. TRACT (Kobo and Pasighat, Burkill's No. 37107) allied to S. geniculatus *C. B. Clarke.*

Flrs. 12.

22. Strobilanthes discolor *T. Anders.*

A shrub, allied to *S. pentstemonoïdes. Leaves* 2-4·5 by 1-2 in., elliptic, crenate-dentate, acuminate, coriaceous, lineolate (raphides) on both surfaces; base narrowed into the petiole or obtuse; petiole ·1-·2 in. long, or almost sub-sessile. *Flowers* in paniculate cymose heads. *Calyx* ·2 in., divided nearly to the base; segments linear-lanceolate, pubescent, somewhat enlarged in fruit. *Corolla* 1·5 in. long, glabrous. *Capsule* ·6 in. long, sparsely pubescent towards the apex.

SIBSAGAR, N.-E. F. TRACT, MANIPUR, NAGA HILLS and KHASI HILLS.

Flrs. & Fr. 7-1.

Some specimens collected in N.-E. F. Tract have got leaves 8·5 by 3 in., and petiole upto ·5 in. long.

23. Strobilanthes isophyllus *T. Anders.*

An almost glabrous undershrub (cultivated). *Leaves* 2-5 by ·4-·6 in., narrow lanceolate or ovate-lanceolate, acu-

minate, sub-coriaceous, undulate, glabrous, both surfaces lineolate (covered with raphides); lateral nerves 4-5 on either half. very oblique; base alternate; petiole ·2-·4 in. long. *Flowers* tawny-coloured in cymose heads. *Bracts* ·2 in., green, elliptic-obtuse; bracteoles ·2 in.. linear-oblong, green, almost glabrous. *Calyx* ·25 in. long; segments sub-linear. *Corolla* about 1 in. long, curved with more or less cylindric base; lobes roundish. *Stamens* hairy. *Capsule* about ·3 in., glabrous, 4-seeded. *Seeds* ·1 in., ovate, silky; areolas usually absent.

KHASI HILLS, SYLHET. (Cultivated).

Flrs. 12-2. Fr. 4.

24. Strobilanthes anisophyllus *T. Anders.*

A shrub 2-3 ft. high; stem zigzag. *Leaves* 1·5-3·5 by ·5-1·2 in., (opposite leaf of each pair absent or much smaller) lanceolate-acuminate, serrulate, glabrous, covered with lateral nerves about 4 on either half; base obtuse or rounded, sometimes narrowed into the petiole ·2 in. long. *Flowers* lavender in cymose heads. *Bracts* elliptic, green. *Calyx* segments ·3 in. long, linear-oblong, pubescent without. *Corolla* pale-purple, glabrous, 1·25 in. long (resembles *S. isophyllus* except the zigzag stem and unequal broader leaves). *Capsule* ·4-·5 in. long.

SYLHET, GARO HILLS (1 200 ft.), KHASI HILLS (4,000 ft.).

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

25. Strobilanthes pauper *Clarke.*

A small shrub. *Leaves* 3·5 by ·7-1 in., lanceolate-acuminate, minutely toothed or sub-entire, glabrate or puberulous beneath, obscurely lineolate; lateral nerves 6-7 on either half; base narrowed into the petiole ·5-1 in. long. *Heads* interrupted in fruit; bracts green, somewhat pubescent, caducous. *Calyx* 5-partite; segments sub-equal, linear-spathulate, glandular-pubescent. *Corolla* about 1·5 in., purple, almost glabrous. *Stamens* glabrous. *Capsule* 4-seeded, pubescent, ·5 in. long. *Seeds* ·1-·12 in., ovate, shaggy.

KHASI HILLS (4-6,000 ft.) (H. f. & T.). (No specimen in Shillong Forest herbarium, F.B.I., Vol. IV. P. 463).

26. Strobilanthes extensus *Nees.*

A small erect shrub, hairy. *Leaves* 1-2 by ·5-1 in., ovate-serrate or sub-entire, acuminate, sub-coriaceous, hairy from near the base; lateral nerves 4-5 on either half, emerging, slender, arcuate; base cordate or rounded, sessile or subsessile. *Flowers* in spikes interrupted towards the base; bracts ·2-·3 in., ovate, glandular, deciduous. *Calyx* ·3-·5 in. long, deeply cleft; segments linear-oblong, glandular pubescent, slightly enlarged in fruit. *Corolla* 1-1·5 in., purplish, curved, glabrous. *Stamens* glabrous; style sparsely hairy. *Capsule* ·6 in. long, 4-seeded. *Seeds* ·12 in., ovate, hairy; areolas small.

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

Flrs. 8-9. Fr. 11.

27. Strobilanthes phyllocaulos *Clarke.*

A stout shrub; branches hairy. *Leaves* about 3·5 by 1·5 in., ovate-acute, serrate, densely hairy above, softly and patently hairy beneath; lateral nerves about 8 on either half; petiole short; spikes long, dense, interrupted below in fruit similar to *Strobilanthes extensus.*

KHASI HILLS (5,000 ft.) Mawflong (J. D. H.).

(No specimen in Shillong Forest herbarium. F.B.I., Vol. IV. P. 464).

28. Strobilanthes denticulatus *T. Anders.*

A shrub; branches quadrangular, minutely puberulous and harsh. *Leaves* 3-6 by 1-2·5 in., elliptic or ovate-elliptic, acuminate, crenate-denticulate, sub-coriaceous (raphides) lanceolate on both surfaces, paler beneath; lateral nerves 8-14 on either half, sub-parallel, arcuate; base narrowed into the petiole, ·5-2·5 in. long; the petiole is often very unequal in opposite pair of leaves. *Flowers* in interrupted spikes. *Bracts* linear-lanceolate, ·4-·6 in. long, sparsely hairy, bracteoles ·3 in. long. *Calyx* 1·5 in., glabrous. (The Assam collection I have examined are glabrous (pubescent *F.B.I.*); filaments

hairy (Nees). *Capsule* ·5-·6 in. *Seeds* ·15 in., ovate-pubescent; areolas small.

PATKOI MOUNTAINS, KHASI HILLS (4,000-6,000 ft.), NAGA HILLS.

Flrs. 9-12. Fr. 2.

29. Strobilanthes agrestis *Clarke.*

An erect undershrub. *Leaves* 4 by 2 in., often unequal, ovate-acuminate, sparsely hairy above, minutely pubescent beneath, serrulate, minutely lineolate on both surfaces; base shortly acuminate; lateral nerves 6 on either half; petioles ·2-·5 in. *Spikes* 1-4 in., hairy, elongate, paniculate, with capitellate tips; bracts ·25 in.; bracteoles ·06 in., linear-oblong. *Corolla* slightly curved, narrowly tubular, ventricose, lavender. *Capsule* 4-seeded, sparsely pubescent.

KHASI HILLS

Var. hemoitis; one leaf of every pair sessile, cordate, less than ¼ the length of the other.

(No specimen in Shillong Forest Herbarium. F.B.I., IV P. 466).

30. Strobilanthes secundus *T. Anders.*

Leaves 2-6 by 1·5-3 in., elliptic, bluntly acute, crenate or sub-entire, sub-coriaceous, almost glabrous; lateral nerves 6-8 on either half; base acute; petiole ·2-·5 in. long. *Flowers* yellow in lax long spikes; bracts caducous. *Calyx* divided nearly to the base, unequal, linear, ·5-·6 in., enlarged in fruit. *Corolla* curved, about 1 in. long. *Capsule* about 1 in., 4-seeded. *Seeds* ovate, ·12-·16 in., areolas small.

UPPER ASSAM, N.-E. F. TRACT, MISHMI, DUFFLA, AKA, NAGA and KHASI HILLS.

Flrs. 12-1. Fr. 2-3.

31. Strobilanthes arborasis *Dunn.*

Leaves 2·3 by 5·5 in., sessile, lanceolate-acuminate, obscurely crenate, glabrous, cystoliths punctiform; lateral nerves 6-7 on either half, prominent above. *Flowers* in lax panicles; bracts ovate, ·23 in. long. *Calyx* divided, linear-laciniate; segments acute. *Corolla* pale lilac, tubulose, 1·35

in. long; lobe 5, rounded. *Stamens* 4. *Ovary* 4, ovulate. *Capsule* oblanceolate, ·58 in. long. *Seeds* 4, rugulose, glabrous.

N.-E. F. TRACT (Sadiya, Kobo) Makum. (Burkill's No. 35757).

Flrs. 11.

32. Strobilanthes flaccidifolius *Nees.* Vern. *Raspat,* Sibsagar.

A shrub. *Leaves* 2-5 by 1-2 in., elliptic or bluntly acute, obscurely crenate, membranous; lateral nerves 6-7 on either half; base cuneate, narrowed into the petiole 1 in. long. *Flowers* in densely panicled lax spikes, usually opposite; bracts ovate, deciduous. *Calyx* segments linear-spathulate. *Corolla* 2 in. long, glabrous. *Capsule* ·75 in., not included at base.

SIBSAGAR, MANIPUR, NAGA HILLS, KHASI HILLS. Cultivated for a blue dye.

Flrs. 12-2.

33. Strobilanthes divaricatus *T. Anders.*

An erect almost glabrous shrub 2-5 ft. high, gregarious. *Leaves* 2-5·5 by ·5-1·8 in., lanceolate or elliptic-lanceolate, long acuminate, serrulate, membranous, obscurely setulose; lateral nerves 4-6 on either half; base cuneate; petiole ·3-·8 in. long. *Flowers* purple in divaricate lax zigzag spikes; bracts very small, caducous, ovate. *Calyx* ·3-1 in., segments narrow-elongate, caudate. *Corolla* 1-5 in., curved, tubular. *Stamens* glabrous. *Capsule* ·5 in., glabrate, 4-seeded. *Seeds* 1 in., ovate, pubescent; areolas small.

KHASI HILLS (5,000 ft.).

Flrs. 10-11. Fr. 12-1.

34. Strobilanthes rubescens *T. Anders.*

A flexuous suberect shrub; branches sparsely pubescent. *Leaves* 2-3·5 by ·8-1·5 in., ovate-acuminate, subentire, coriaceous, hairy; lateral nerves 5-6 on either half, upper sessile,

base cordate, lower sub-sessile; base rounded. *Flowers* in paniculate laxly flowered spikes. *Bracts* ·12 in., ovate; bracteoles linear. *Calyx* ·3-·5 in., deeply cleft; segments linear-lanceolate, glabrous, slightly enlarged in fruit. *Corolla* purplish, ·8-1·2 in. long, almost straight, glabrous; lobes 5, rounded. *Capsule* ·6 in. long, glabrous, 4-seeded. *Seeds* ovate; areola small.

KHASI HILLS (4,500 ft.).

Flrs. & Fr. Cold season.

35. Strobilanthes boerhavioides *T. Anders.*

A gregarious shrub upto 6-8 ft. high; stem terete, glabrous. *Leaves* 3-6 by 2-3 in., ovate, long acuminate, crenate, very dissimilar in the same pair, glabrous, dark green; lateral nerves 6-8 on either half, sub-parallel, acuminate; base obtuse or subcordate; petiole ·8-1·5 in. long. *Flowers* in pairs in lax axillary spikes; bracts broad-ovate, ·1 by ·08 in. *Calyx* segments linear-lanceolate, whitish, all equal. *Corolla* bluish purple, glabrous, membranous; tube ·75 in. long, mouth about ·3 in. across; lobes orbicular, equal, notched at the apex or emarginate. *Capsule* ·4-·5 in. long, glabrous, oblanceolate, almost terete.

KHASI HILLS (5,000 ft.).

Flrs. 9-10. Fr. 10-11.

36. Strobilanthes Helictus *T. Anders.*

A shrub; young branchlets often pubescent. *Leaves* elliptic, elliptic-lanceolate, acuminate, serrate, membranous, glabrous, lineolate above; lateral nerves 6-7 on either half, oblique, quite conspicuous; base obtuse or cuneate; petiole ·5-1·25 in. long. *Flowers* alternate in lax zigzag elongated spikes. *Bracts* linear ·4-·5 in. *Calyx* ·8-1 in., segments linear-lanceolate, acuminate, enlarged in fruit, sparsely hairy. *Capsule* ·6-·75 in. long, 4-seeded, glabrous. *Seeds* ·16 in., ovate, pubescent; areolas very small.

NAGA HILLS, KHASI HILLS (4,000 ft. Griffith).

Flrs. 9-10. Fr. 11-2.

37. Strobilanthes Griffithianus *T. Anders.*

A large shrub 3-7 ft. *Leaves* 3-7 by 1·2-2 in., lanceolate or elliptic-lanceolate, acuminate, denticulate or subentire, coriaceous, lineolate on both surfaces; lateral nerves 8-10 on either half, oblique, sub-parallel; base cuneate; petiole ·2-·7 in. long. *Flowers* distant in panicled pubescent spikes. *Bracts* lanceolate, obtuse, persistent, opposite, unequal, about 1 in. or more; bracteoles ·25 in., linear-oblong. *Calyx* ·4-·5 in., divided nearly to the base; segments unequal, linear, pubescent, one longest. *Corolla* yellowish about ·2 in. long; tube linear-cylindric as long as the upper ventricose half. *Stamens* hairy. *Capsule* ·6-·8 in., glabrous, 4-seeded. *Seeds* ·15 in. across, sub-orbicular, sparsely pubescent; areola small.

KHASI HILLS (2,000 ft.).

Flrs. & Fr. Cold season.

38. Strobilanthes elongatus *Clarke.*

A glabrous shrub. *Leaves* 4·25 by 1·25 in., lanceolate-acuminate, minutely serrulate, densely lineolate above; base cuneate; lateral nerves 11 on either half; petiole ·25 in. long. *Flowers* alternate and opposite, distant in very long lax axillary or quasi-terminal spikes; bracts lanceolate, persistent; bracteoles linear, shorter than the bracts. *Calyx* segments linear-lanceolate, glabrous, ·3 in. *Capsule* ·2-·3 in., 4-seeded. glabrous.

Namrup—LAKHIMPUR.

(No specimen in Shillong Forest Herbarium. F.B.I., Vol. IV. P. 470).

39. Strobilanthes nobilis *Clarke.*

A shrub, gregarious. *Leaves* 4-8 by 2-3 in., elliptic, unequal sided, acuminate, serrate, coriaceous, lineolate above, glabrous and paler beneath; lateral nerves 10-12 on either half; base cuneate or narrowed into the short petiole, upper leaves almost sessile. *Flowers* in flexuous, panicled, pubescent spikes. *Bracts* about 1 in., lanceolate, acute, persistent, hairy; bracteoles about ·7 in. long, linear-lanceolate. *Calyx* ·6 in.;

segments almost free, linear, scaberulous. *Corolla* not seen. *Capsule* ·8 in. long, glabrous. *Seeds* 4, ovate, ·16 in. long; areola small.

K. & J. HILLS (3,500 ft.).

Flrs. 11.

40. Strobilanthes urophyllus *Nees.*

An undershrub. *Leaves* 2·5·5 by ·8·1·5 in., elliptic-lanceolate, acuminate, obscurely crenate, membranous, glabrous; lateral nerves 5-8 on either half; base cuneate; petiole 1·1·5 in. long. *Flowers* scattered on small leafy branchlets. *Bracts* green, foliaceous. *Calyx* ·2·3 in.; segments linear, enlarged in fruit. hairy. *Corolla* ·6·8 in., curved, finely hairy outside. *Capsule* ·3·5 in., 4-seeded. *Seeds* ·12 in., ovate, pubescent; areolas very small.

KHASI HILLS (4,000 ft.).

Flrs. 3. Fr. 11.

41. Strobilanthes stenophyllus *Clarke.*

A small erect densely branched shrub. *Leaves* 2·25 by ·3 in., narrow-lanceolate, denticulate, undulate or sub-entire, bluntly acuminate, glabrous above, pubescent along the nerves beneath; nerves 5-6 on either half; base attenuate. *Flowers* in axillary or terminal glabrous spikes; lower bract foliaceous; upper spathulate; bracteoles very small, ovate. *Calyx* segments ·3·5 in., subequal, linear-obtuse. *Corolla* about 1 in., almost straight, hairy within; cylindric tube shorter than the ventricose upper portion; lobes rounded. *Stamens* hairy upwards. *Ovary* glabrous; style sparsely hairy. *Capsule* ·6 in. *Seeds* 4, ovate, pubescent, ·12·16 in.; areolas obsolete.

KHASI HILLS (Barapani C. B. Clarke 16362). (F.B.I., Vol. IV P. 473).

Flrs. 10.

42. Strobilanthes Panichanga *T. Anders.*

A shrub; branches tetragonous; young parts pubescent. *Leaves* 4-7 by 1·5-3 in., broadly elliptic, acuminate, serrate,

membranous, lineolate, pubescent on the nerves; lateral nerves 9-10 on either half, parallel, arcuate; base cuneate; petiole ·5-1 in. long, pubescent. *Flowers* in trichotomous cymose panicles. *Bracts* and bracteoles linear, pubescent. *Calyx* deeply 5-cleft; segments linear-lanceolate, pubescent. *Corolla* about 1 in., finely hairy, almost straight; lobes roundish. *Capsule* (not seen) more than ·5 in. (Hooker).

SYLHET (Wallich), CACHAR (Keenan).

43. Strobilanthes coloratus *T. Anders.*

A glabrous undershrub in shady localities. *Leaves* 2·5-6 by 1·5-3 in., ovate or elliptic-lanceolate, acuminate, glandular, crenate-serrate, glabrous, often copper coloured; lateral nerves about 7 on either half, arcuate, more prominent above, base rounded or cuneate; petiole ·3-1·8 in. long. *Flowers* purplish on large terminal cymose panicles. *Bracts* ·25 by ·16 in., light green, ovate or elliptic. *Calyx* 1·5 in. long, with raphides outside, 5-cleft; segments green, ·3 in. long, lanceolate, curved. *Corolla* tube ·5-·6 in. across, narrowly funnel-shaped; lobes subequal. *Stamens* 0, included; style slightly exserted. *Capsule* ·3-·5 in. long, 4-seeded. *Seeds* ·12-·16 in., ovate, pubescent; areolas scarcely any.

N. E. F. TRACT, LAKHIMPUR, AKA HILLS, GOALPARA, KHASI HILLS (5,000 ft.).

Flrs. & Fr. Cold season.

S. furcatus *Biswas.*

An undershrub; branches terete, not furfuraceous. *Leaves* 2·5-5·5 in. long, ·8-1·5 in. broad, sub-petiolate, somewhat tapering to the base, distantly crenate along the margin, finely lineolate on both the surfaces, somewhat glaucescent beneath, acuminate at the apices, the leaves forming an angle of 60°-90° at the point of attachment. *Inflorescence* spicate, furcate, very rarely terminal, never congested above, almost smooth, 2-4·8 in. long, more or less divergent in older branches, nearly smooth. *Bracts* almost equal to the calyx lobes, very finely lineolate on the exterior, oblong-ovate or elliptic-lanceolate, acute or acuminate. *Calyx* lobes equal to or longer than the bracts, more or less very finely lineolate, ·33-·4 in. long and

·05-·1 in. broad. *Corolla* elongate, ·4 in. broad. *Stamens* 4, didynamous. *Style* long, linear. *Fruits* not seen.

Panglo woods, JAINTIA HILLS. 4-5,000 ft. May 1878 No. 914 (Type in Calcutta Herbarium).

The specimen is allied to *S. lancifolius* T. Anders. But it is easily distinguished from *S. lancifolius* by its furcate, rather divergent, axillary glabrous, spicate arrangement of the racemes. The bracts and calyx-segments are all very finely lineolate on the exterior and are nearly equal in length but the bracts are often slightly larger, more subulate at the apices, *S. lancifolius* is distinctly marked by its terminal crowded nature of the inflorescence, glandular hairy or pubescent bracts and calyx-segments and the bracts being nearly half the size of the calyx lobes. The leaves of *S. furcatus* are sub-petiolate, not oblong-elliptic, more furcate at the base, petiole smaller and crenation more distant. Flowers also are more or less smaller in size.

Flrs. 5.

S. parryorum *Fischer.*

A tall shrub; branches terete, brownish tomentose towards the apex, lower parts glabrous. *Leaves* 4·4-8·4 by 1·5-4·4 in., ovate-elliptic, denticulate, acuminate-glabrous when mature, often minutely hispid on the nerves beneath, minutely lanceolate; lateral nerves 8-12 on either half, arcuate. *Spikes* terminal and axillary, interrupted. *Flowers* in opposite pairs; bracts ·5-1·2 in. long, oblong, spathulate, rounded at the apex, densely brown tomentose; bracteole 2·4-6 in. long, linear-obtuse. *Calyx*-segments 5, sub-equal, almost free, linear-obtuse. *Corolla* 1·4 in. long, white, yellowish, tubular, ventricose, slightly curved, sparsely puberulous outside, usually glabrous inside; lobes sub-equal, broadly oblong, obtuse, ·2 in. long. *Stamens* 4, anthers linear, 17 in. long, ventrically sparsely ciliate; base short, bilobed. *Ovary* narrowly fusiform, laterally compressed, glabrous, ·25-·3 in. long; ovules 4; style filiform, glabrous. *Capsule* narrowly clavate, apiculate, glabrous, ·6 in. long. *Seeds* 4, suborbicular, ·16 in. long, hygroscopically shaggy or hairy.

ASSAM (Lushai Hills—Darzo 4,600 ft.) (No. 155 Mrs. N. E. Parry-March).

S. pentstemonoides *T. Anders.*

Rather herbaceous 3-8 ft., much branched, even grained. *Leaves* 3-8 by 1·5-2·8 in., elliptic, elliptic-lanceolate, acuminate, serrate, coriaceous, glabrous, lanceolate; lateral nerves 6-9 on either half; base narrowed into the petiole (sometimes rounded); petiole ·2-·4 in. long. *Flowers* in peduncled heads, sometimes panicled; peduncles hairy. *Bracts* orbicular, whitish. *Calyx* ·25 in., pubescent, accrescent

in fruit; segments linear. *Corolla* 1·5 in. long, purplish, glabrous, somewhat curved. *Stamens* glabrous. *Capsule* ·6-1 in. long, glandular-pubescent, 4-seeded. *Seeds* ·12 in., silky; areolas very small.

NAGA HILLS, SIBSAGAR, DUFFLA HILLS.

Flrs. 11-1. Fr. 2-3.

S. mastersi *T. Anders.*

An erect shrub; stem tetragonous; young branches glandular, hairy. *Leaves* 4·5-6 by 1·25-1·8 in., lanceolate-acuminate, serrate, subcoriaceous, glabrate; lateral nerves 7-9 on either half, oblique; base obtuse or acute; petiole ·05-·2 in. long. *Flowers* in dichotomous lax panicles, glandular, viscous; bracts-lanceolate, acute, sparsely glandular-deciduous. *Calyx* ·3-·4 in., deeply divided; segments linear-glandular, viscous, equal. *Corolla* about 1 in., funnel-shaped, almost straight, glabrous; lobes-obscure. *Stamens* included. *Capsule* oblanceolate-elongate, tip glandular, 4-seeded (Hooker).

(No specimen in Shillong Forest herbarium).

ASSAM (Masters, Simons)

S. spicatus *T. Anders.*

An undershrub, pubescent. *Leaves* 1-3 by ·5-1·9 in., ovate or ovate-lanceolate, acute, serrate, subcoriaceous, tomentose, paler beneath; lateral nerves 6-8 on either half; base obscurely cordate or rounded; petiole ·05-·15 in. long. *Flowers* in terminal elongated spikes. *Bracts* foliaceous, ovate, pubescent; bracteoles spathulate. *Calyx* ·5 in.; segments unequal, linear, pubescent. *Corolla* bluish purple, 1·5 in., funnel-shaped, glabrous. *Capsule* ·5-·6 in., 4-seeded, hairy at the apex. *Seeds* ·08 in. across, suborbicular, pubescent; areola almost obsolete.

KHASI HILLS.

Flrs. & Fr. Cold season.

S. trichophorus *C. E. C. Fischer.* Vern. *Samboda,* Garo.

Undershrub. *Stem* woody, slender, erect, 15-35 in. long, terete below, quadrangular upwards, sharply so and almost winged near the apex, hairy with long white spreading hairs above. *Leaves* 3·2 in. long, 1·2 in. wide, elliptic-lanceolate, acute, membranous, pellucid-dotted, upper surface with numerous punctiform and shortly linear cystoliths, white-hairy and dark-green above, more sparsely and pale below, margins undulate-crenate; base rounded or slightly cordate; petioles less than ·7 in. long. *Spikes* axilliary, simple or with a short

branch near the base, interrupted, upto ·5 in. long; rhachis sharply quadrangular, pubescent and beset with long spreading soft white septate hairs; bracts in opposite pairs, ·25 in. apart, spathulate, obovate, subacute, thick, green, ·4 in. long, ·2 in. wide, 5-ribbed, densely hairy on both faces with mixed short and long hairs, many of them gland-tipped, and with longer soft white hairs. *Flowers* solitary in each bract. *Calyx* sessile, ·4 in. long, tube very short; segments 5, lorate, obtuse, green and with the same indumentum in the apical half as the bracts, brownish and glabrous below. *Corolla* ventricose with a very short narrowly cylindrical base, ·6 in. long, blue, sparsely hairy, with gland-tipped hairs without, glabrous within except for a brush of white hairs behind the anthers and a few hairs at the insertion of the stamens. *Disc* annular. *Stamens* 4, in pairs. *Style* slender, as long as the corolla, apex recurved, undivided. *Ovary* oblong, glabrous; ovules 4.

GARO HILLS (Emangiri 2,000 ft.) (Mrs. N. E. Parry 1076)

S. glutinosus *Nees* is also recorded from the region of the Flora.

5. ERANTHEMUM Linn. (Dædalacanthus).

Shrubs, undershrubs or perennial herbs. *Leaves* opposite, entire or obscurely crenulate, lanceolate. *Flowers* in spikes, heads or corymbs; bracts usually large and conspicuous; bracteoles narrow, small. *Calyx* 5-fid; lobes narrow, often scarious. *Corolla* tube long, slender, widened near the mouth or sometimes at the middle; lobes obovate, twisted to the left. *Stamens* 2, perfect, glabrous, 2 staminodes or 0; anthers oblong, 2-celled, exserted or subincluded. *Ovary* glabrous, 2 ovules in each style; style long and slender, glabrous, sparsely pubescent; stigma sessile. *Capsule* clavate with solid base. *Seeds* 4, compressed, discoid on sharp retinacula, hairy when wetted.

Corolla tube slender, cylindric:—
Anthers exserted:—
Petiole up to 2 in. Peduncles up to 3 in. *1. E. nervosum.*
Petiole up to ·3 in. long. Peduncles upto 4 in. .. *2. E. macrophyllus.*

E. strictum *Coleber*=D. strictus T. Anders. A small pubescent herb with basal leaves, blue flowers and large bracts is also recorded from KHASI HILLS.

Anthers included:—
Petiole up to 1 in. Bracts obovate-narrowed, not ciliate. Leaves elliptic. .. 3. *E. suffruticosus.*
Petiole up to 2 in. Bracts ovate-lanceolate, ciliate. Leaves ovate. .. 4. *E. purpurascens.*

1. Eranthemum nervosum *R. Br.*=Dædalacanthus nervosus *T. Anders.* Vern. *Samscrew, Jagan-suh,* Mik.

A shrub or an undershrub up to 6 ft. high; branches puberulous. *Leaves* 3-7 by 1-2·5 in., elliptic or ovate, acuminate, usually entire or obscurely crenate, thinly chartaceous, dark green, cystoliths imbedded; lateral nerves 8-12 on either half, arcuate near the margin, sub-parallel: base cuneate or tapering; petiole ·5-2 in. long. *Flowers* bright blue, ·75 in. in dense bracteate spikes collected in large terminal panicles. *Peduncles* up to 3 in., puberulous; bracts conspicuous, white with green nerves, elliptic or obovate-oblong, ·6 in. long, cuspidate or abruptly short-acuminate; bracteoles linear-membranous. *Calyx* about ·25 in. long, directed half way down, minutely pubescent. *Corolla* up to 1·5 in. long; tube narrow, cylindric, widened at the mouth; lobes subequal. *Capsule* ·5 in. long, oblong, glabrous.

SIBSAGAR, DARRANG, KAMRUP, GARO HILLS, KHASI HILLS (upto 3,000 ft.).

Flrs. 1-3. Fr. Rainy season.

2. Eranthemum macrophyllum *Wall*=Dædalacanthus macrophyllus T. Anders.

A shrub closely allied to *D. nervosus* T. Anders. *Leaves* 3-7 by 1·5-2 in., elliptic-acuminate, subentire or obscurely crenulate, thin, scaberulous on the nerves beneath; base tapering; petiole 0-·2 in. long. *Inflorescence* lax. *Peduncles* up to 5 in. long.

GOALPARA (Mann No. 10).
There is also a fragmentary specimen in the herbarium collected in Goalpara by W. Fisher in 1879 marked *D. scaber.*

Flrs. 4.

3. Eranthemum suffruticosum *Roxb.*=Dædalacanthus suffruticosus *T. Anderrs.*

A small undershrub about 2 ft. high. *Branchlets* obscure, 4-angled, rusty pubescent. *Leaves* 1·5-5 by ·5-2·5 in., elliptic-acute or acuminate, entire, undulate or very obscurely crenulate, membranous, dark green above, paler beneath, scaberulous; lateral nerves 5-7 on either half; base cuneate: petiole ·3-1 in. long. *Flowers* purple with a white centre, usually very few in terminal spikes; bracts nervose, bluntly acute, ·8 by 1·2 in. (not ciliate). *Calyx* dilated half way down; lobes linear-lanceolate. *Corolla* tube slender, 1·75 in. long, glabrous, mouth widened, ·8 in. across. *Anthers* included.

SYLHET.

Flrs. 11.

4. Eranthemum pulchellum *Andrew.* Var. purpurascens O. Ktze.=Dædalacanthus purpurascens T. Anders.

An undershrub 2-3 ft. high; branchlets quadrangular, puberulous. *Leaves* 3-6 by 1·5-3·5 in., ovate, broadly elliptic, obtuse or acute, rarely acuminate, subentire or oblong-acute, thin, densely lineolate; lateral nerves 6-9 on either half; base decurrent on the petiole up to 2 in. long. *Flowers* purplish in axillary or terminal spikes often ternate; peduncles long, 1·5-3 in. long. *Spikes* up to 5·5 in. long; bracts veined, ovate-lanceolate, acuminate, ciliate. *Calyx* ·25 in. *Corolla* tube finely pubescent, 1·3 in. long, mouth ·6 in. across. *Anthers* subinculded. *Capsule* ·5-·7 in., glabrous.

CACHAR, UPPER ASSAM.

Flrs. 12.

Eranthemum ciliatum (*Craib*) *R. Ben.*
Flowers bluish-mauve.

NAGA HILLS 750 M. (Bor. 2939).

Flrs. 3.

6. ACANTHUS Linn.

Acanthus leucostachyus *Wall.*

A shrub, decumbent stem woolly. *Leaves* 3-7 by 1-2·5 in., elliptic or oblong, obtuse or acute, spinous-serrate, subcoriaceous, glabrous above, pubescent along the nerves beneath also whitened; lateral nerves 7-13 on either half, nerves conspicuously reticulate; base cuneate; petiole ·3-·6 in. long. *Flowers* usually in terminal hairy spikes; bracts ·5-·9 in., linear-elliptic, hairy on both surfaces, spinous-toothed. *Calyx* hairy, 2 outer larger than the 2 inner, hairy, ciliate. *Corolla* white or purplish; tube short. *Anther* 1-celled, bearded. *Disc* obsolete. *Capsule* ellipsoid, compressed, ·4-·6 in., glabrous, shining, 4-seeded. *Seeds* compressed, glabrous.

KHASI HILLS.

Flrs. 3. Fr. Rainy season.

7. ANDROGRAPHIS Wall.

Andrographis paniculata *Nees.* Vern. *Kalmegh,* Beng.; *Kirata, Bhunimba,* Sans.

An erect herb; stem quadrangular; young parts glandular-hairy. *Leaves* 1·5-2·5 by ·5-·8 in., subsessile, lanceolate or linear-lanceolate. *Calyx* segments equal, linear, glandular, narrow. *Corolla* white or purplish, spotted, 2-lipped, usually pubescent. *Stamens* 2; filaments ciliate; anthers exserted; cells bearded at the base. *Ovary* hairy, 3-9 ovules in each cell. *Capsule* glandular hairy when young, glabrous on maturity.

Plains of ASSAM.

The bitter shrub is well-known under the name of *Kalmeg.* The whole plant is bitter and the medicinal properties of the plant are many. It is officinal in the British Pharmacopœia (febrifuge, stomachic, tonic, alterative and anthelmintic and also for liver complaints).

Flrs. & Fr. 8-5.

8. GYMNOSTACHYUM Nees.

Gymnostachyum venustum *T. Anders.* Vern. *Jakhi,* Khasi.

A semi-herbaceous perennial 5-6 ft. high. *Leaves* 5-9 by 1·5-3 in., elliptic-ovate, obovate, entire, undulate or crenulate, membranous, scaberulous above, plain and pubescent, specially on the nerves beneath; base decurrent on the petiole, 4 in. long. *Cymes* in pubescent panicles, usually very large, sometimes very reduced. *Calyx* 5-fid; segments linear-lanceolate. *Corolla* limb purple, bluish, 1-1·25 in. long. *Stamens* 2, as long as the corolla; filaments hairy at the base; anthers 2-celled. *Ovary* pubescent; ovules many. *Capsule* linear, about ·8 in. long, many seeded. *Seeds* ovoid, compressed, hairy when wetted.

K. & J. HILLS (upto 4,000 ft.).

Flrs. 10. Fr. Cold season.

9. PHLOGACANTHUS Nees.

Shrubs or tall herbs. *Leaves* entire or obscurely crenate. *Flowers* showy, orange red or pink in terminal thyrsoid narrow panicles, rarely in axillary racemes or cymes; bracts small. *Calyx* deeply 5-fid; segments narrow. *Corolla* tubular, curved; tube oblique, 2-lipped; lobes connivent, patent or recurved, imbricate in bud. *Stamens* 2, sometimes with 2 small staminodes; anthers 2-celled, oblong, muticous, glabrous. *Ovary* 2-celled; ovules 5-8 in each cell; style filiform; stigma subsimple. *Capsule* elongate, sub-4-angled, seed bearing from the base. *Seeds* lenticular, ovate in outline, glabrous or densely shortly hairy.

Inflorescence dense terminal thyrsus:—

Leaves glabrous or almost so:—

Petiole up to 3 in. Inflorescence upto 8 in., shortly peduncled. Corolla 2·5 in., light rosy.	1.	*P curviflorus.*
Petiole upto 1·8 in. Inflorescence 4 in., shortly peduncled. Corolla ·7 in. long, red.	2.	*P. Wallichii.*
Petiole up to 1·5 in. long. Inflorescence upto 6 in. long. Corolla ·8 in, yellow. ..	3.	*P. guttatus.*
Petiole upto 2 in. long. Inflorescence upto 12 in. long. Corolla ·8 in. long, orange. ..	4.	*P. thyrsiflorus.*

Leaves pubescent. Petiole upto 3·3 in. Inflorescence upto 11 in. Corolla 1 in. ..	5.	*P. tubiflorus.*
Leaves hairy or punctate; petiole upto 1 in. Inflorescence about 4 in. Corolla ·5 in. ..	6.	*P. asperulus.*
Inflorescence short axillary panicles or cymes:—		
Leaves pubescent beneath specially on the nerves; petiole upto 8 in. Cymes almost glabrous; anthers far exserted.	7.	*P. pubinervius.*
Leaves glabrous; petiole upto 1·5 in. Panicle pubescent. Anther sub-included, shortly exserted.	8.	*P. Jenkinsii.*

1. Phlogacanthus curviflorus *Nees.* Vern. *Mogang-sudi,* Kach.; *Kona-oing,* Miri; *Dhapa-tita,* Ass.; *Vatteju.* Lush.; *Kham-chhit,* Garo; *Tew-phot-saw,* Khasi.

A shrub 10-20 ft. long. *Leaves* 4-16 by 1·5-5·5 in., ovate or elliptic (often unequal sided and oblique) acute or acuminate, entire, undulate or cuneate, rather membranous, glabrate when mature (pubescent beneath when young); lateral nerves 8-10 on either half, subparallel; base cuneate or narrowed into the petiole, ·5-3 in. long. *Inflorescence* 6-8 in. long, densely pubescent. *Calyx* teeth linear, ·3-·4 in. long. *Corolla* light rose or pink, 2-2·5 in. long. *Capsule* 1·2-1·5 in. long. *Seeds* many, compressed, lenticular, glabrous.

N. E. F. TRACT, LAKHIMPUR, NOWGONG, DARRANG, CACHAR, SYLHET, LUSHAI HILLS, GARO HILLS, KHASI HILLS (upto 4,000 ft.).

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

2. Phlogacanthus Wallichii *Clarke.*

A shrub 8 ft. high. *Bark* green. *Leaves* 9-12 by 3-4·5 in., elliptic-accuminate, entire or obscurely undulate, thinly chartaceous, glabrous; lateral nerves 7-9 on either half; base cuneate or narrowed into the petiole ·8-1·8 in. long. *Inflorescence* pubescent, 2-4 in. long. *Calyx* pubescent; teeth triangular, lanceolate. *Corolla* ·7 in., red, pubescent. *Capsule* not seen.

KHASI HILLS, upto 3,000 ft.

Flrs. 10. Fr. Cold season (?).

3. Phlogacanthus guttatus *Nees.*

An undershrub almost glabrous. *Leaves* 5-9 by 2-3 in., elliptic (broadly elliptic), elliptic-lanceolate, acuminate, entire or subentire, subcoriaceous, glabrous; lateral nerves 8-11, arcuate, slender, conspicuous: base cuneate or narrowed into the petiole about 1·5 in. long. *Panicle* terminal or subterminal, sparsely pubescent. *Flowers* greenish white, spotted. *Calyx*-segments pubescent, linear-lanceolate, ·15 in. long. *Corolla* bilabiate, about ·5 in. long, pubescent. *Capsule* 1·25 by ·5 in., 12-seeded (Hooker).

KHASI HILLS (2-4000 ft.) (Mawsmai).

Flrs. 11.

4. Phlogacanthus thyrsiflorus *Nees.* Vern. *Eliot,* Garo; *Banheka, Ram-bahonka, Ronga-bahoka, Titaphul, Titabahak,* Ass.; *Baskabomphang, Barsiku, Jathang-heh, Dieng-soh-ja-buid, Soh-ja-jut, Dieng-soh-kajut, Ja-boit,* Khasi; *Rambha arong, Jaogan, Jakan,* Mik.

An evergreen shrub 8 ft. high. *Bark* yellowish-brown, striate. *Branchlets* quadrangular. *Leaves* 6-14 by 1·5-4 in., oblanceolate, elliptic-oblong, acute or acuminate, entire, chartaceous, closely punctate, dark glossy green above, pale beneath; lateral nerves 10-12 on either half, arcuate,; base tapering into the petiole ·5-3 in. long. *Inflorescence* 10-12 in. long, pubescent. *Bract* pubescent, ·5-·7 in. long, linear, apiculate, caducous. *Calyx* pubescent, ·4 in. long. *Corolla* ·5-·8 in., orange (sometimes yellow as a freak, U. Kanjilal). *Capsule* up to 1·5 in. long, dilated at top. *Seeds* 12-14.

Common throughout the province (upto 4000 ft.).

Flowers are eaten cooked as vegetable. Fruit and the leaves are taken by the Mikirs after burning them as a specific for fever. In the Punjab, it is put to the same uses as *Adhatoda vasica* Nees (*I.M.P.*).

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

5. Phlogacanthus tubiflorus *Nees.* Vern. *Banchok, Banchha,* Mik.; *Battejup,* Tipp.; *Bhataitita,* Ass.

A shrub 6-8 ft. high. *Leaves* 4-11 by 2-5·5 in., elliptic, ovate-acuminate, entire, subentire or obscurely crenulate,

thinly chartaceous, densely granulate above, pubescent specially on the nerves beneath; lateral nerves 8-10; base cuneate or tapering into a petiole ·5-3·3 in. long. *Inflorescence* dense or lax up to 11 in. long, somewhat hairy. *Calyx* glabrate or pubescent; segment triangular, lanceolate, ·15 in. long. *Corolla* 1 in., red, curved, gradually slightly widened at the mouth. *Capsule* 1-1·3 in., glabrous. *Seeds* compressed, glabrous, blackish brown.

SIBSAGAR, NOWGONG, SYLHET, GARO HILLS, KHASI HILLS (upto 3,000 ft.).

Flowers are eaten cooked as vegetables. Used for washing by rubbing the leaves which gives a lather with water.

Flrs. 12-1. Fr. 1-3.

6. Phlogacanthus asperulus *Nees.*

A shrub, glabrous. *Leaves* 2-8 by ·8-2·5 in., elliptic, broad-elliptic or acuminate, entire or undulate, subcoriaceous, glabrous, punctuate beneath; lateral nerves 7-9 on either half, arcuate; base cuneate or narrowed into the petiole ·3-1 in. long. *Inflorescence* 3-4 in., sparsely pubescent. *Calyx* pubescent; teeth linear, apiculate. *Corolla* about ·5 in., pubescent, pinkish, curved and widened at the mouth. *Capsule* ·6 in., glabrous.

LAKHIMPUR, KHASI HILLS (upto 5,000 ft.)

Flrs. 3. Fr. 5.

7. Pholagacanthus pubinervius *T. Anders.*

A large shrub (20′/18″). *Bark* light chocolate brown or greyish and softly corky outside with fine ventral fissures exfoliating in thin flakes, ·12-·2 in. thick; inside very softly fibrous, light dun brown. *Leaves* 2-6 by ·5-2·5 in., elliptic, acute or acuminate, entire, membranous, punctate above, obscurely pubescent on the nerves beneath; lateral nerves 7-8 on either half, oblique; base tapering into the petiole ·5-1 in. *Cymes* numerous, sub-sessile (sometimes flowers solitary); pedicels often ·3 in. long. *Calyx* punctate; teeth ·3 in. long, linear-oblong, lanceolate, woolly at the margin. *Corolla* ·7 in. long, yellow with brown veins, tubular,

curved, widened at the mouth, 5-lobed, puberulous. *Anthers* far-exserted.

K. & J. HILLS (upto 5.000 ft.).

Flrs. 11-3. Fr. Hot season.

8. Phlogacanthus Jenkinsii *Clarke.*

Branches stout, quadrangular. *Leaves* 6.5 by 2.25 in., elliptic-acute, subentire; petiole 1·5 in. *Inflorescence* grey pubescent. *Calyx* segments linear-lanceolate, ·25 in., grey pubescent. *Corolla* puberulous. *Stamens* 2, glabrous; anthers short, exserted. *Ovary* glabrous, 12-ovulate; style glabrous.

No specimens in Forest Herbarium, Shillong, F.B.I., Vol. IV P. 513.

10. BARLERIA Linn.

Shrubs or herbs, sometimes spinescent. *Leaves* opposite, entire. *Flowers* showy, sessile, solitary or in spikes. *Calyx* deeply 4-partite in decussate pairs, outer pair much the larger. *Corolla* funnel-shaped; tube elongate; lobes 5, subequal, imbricate in bud. *Stamens* 2, fertile, rudimentary and often a rudimentary 5th. *Anthers* oblong, 2-celled. *Disc* large, often cupular and toothed. *Ovary* with 2 ovules in each cell; style long, shortly bifid or subentire. *Capsule* ovoid or oblong. 2-4-seeded. *Seeds* compound with closely adpressed silky hairs.

Unarmed:—

Spikes few flowered, not unilateral Outer calyx-segments pectinately toothed. Flowers usually white or rose coloured. . ..	1.	*B. cristata.*
Spikes unilateral. Outer calyx-segments obscurely serrulate. Flowers blue.	2.	*B. strigosa.*

1. Barleria cristata *Linn.*

A small uundershrub. *Branches* adpressed pubescent. *Leaves* variable, 2.5 by ·8-1·5 in., oblong or elliptic-oblong, acute or acuminate, membraneous, lanceolate above, pubescent on both surfaces, specially along the nerves beneath, paler beneath; base acute; petiole ·1-·3 in. long. *Flowers* rose coloured, purplish blue or about 1 in. across, solitary

or paired or in short spikes; bracteoles up to ·5 in. long, pubescent, linear, linear-lanceolate, mucronate, acute. *Calyx*-segments ·6-·8 in. long, prominently reticulate, pectinately bristle-toothed; inner segments lanceolate, about ·3 in. long. *Corolla* 1-2 in. long, pubescent outside; lobes obovate-oblong, equalling the tube. *Stamens* 2. *Capsule* about ·6 in., ellipsoid, tapering at 4 ends, 4-seeded.

NOWGONG, KHASI HILLS.
The seeds are supposed to be an antidote for snake-bite and the roots and leaves are used to reduce swelling and an infusion is given in coughs (Watt).

Flrs. 9-11. Fr. Cold season.

2. Barleria strigosa *Willd.*

A small undershrub 2-4 ft. high. *Branches* brown, strigose. *Leaves* 3-8 by 1·5-4 in., ovate-elliptic, acuminate, membranous, usually lineolate and sparingly pubescent along the nerves above, strigose specially along the nerves beneath; lateral nerves 5-6 on either half, somewhat remote; base long, decurrent on the petiole 0-·2 in. long. *Flowers* blue, unilateral on hairy spikes 1-3 in. long; bracteoles oblong or ovate-elliptic, ciliate. *Outer*-sepals about 1 in., obscurely mucronate beneath. *Corolla* 1 in. across, 1·5-2 in. long; lobes obovate. *Capsule* ·6-·75 in., glabrous, apiculate, 4-seeded.

Plains of ASSAM (not very common).
The root is used by Santals as a remedy for cough (*I.M.P.*).

Flrs. 9-12. Fr. Cold season.

11. MACKAYA Harv. (Asystasia Blume).

Herbs or undershrubs. *Leaves* entire, lineolate. *Flowers* moderate sized in lax or dense usually 1-seeded simple or compound spikes or racemes; bracts and bracteoles linear, usually shorter than the calyx, 5-partite; segments linear and lanceolate. *Corolla* tube cylindric below, funnel-shaped or ventricose above; lobes 5, subequal, imbricate in bud. *Stamens* 4, perfect, didynamous; anther cells parallel, approximate, minutely spurred or with the bases only obscurely

whitened. *Ovary* 2-celled, 2 ovules in each cell; style linear; stigma 2 fid or subcapitate. *Capsule* elliptic; base contracted, solid. *Seeds* compressed, orbicular, angular, rugose, tubular or glabrous.

Corolla ventricose upwards about 1·25 in. long.
Leaves 1-4 by ·5-1·2 in., petiole upto ·1-·3 in. 1. *M. macrocarpa.*
Corolla funnel-shaped upwards, 2-2·2 in long.
Leaves 4-9 by 2-4 in, petiole 5-2 in. long. .. 2. *M. Neesiana.*

1. Mackaya macrocarpa *Nees.*

A rambling undershrub; young parts pubescent. *Leaves* 1-4 by ·5-1·2 in., narrow, oblong or elliptic, lanceolate, acuminate, entire, membranous, pubescent; lateral nerves about 5-8, obscure on either half; base narrowed into the petiole ·1-·3 in. long. *Flowers* purplish in 1-sided rather lax racemes. *Calyx* pubescent, ·25 in. long. *Corolla* 1-1·25 in. long, pubescent. *Anther* cells distinctly spurred at the base. *Capsule* 1·3 in. long, pubescent.

GOALPARA.

Flrs. 2. Fr. Hot season.

2. Mackaya Neesiana *Nees.* Vern. *Obul-oing,* Abor.

A small shrub. *Leaves* 4-9 by 2-4 in., elliptic or ovate-elliptic, acute or acuminate, membranous, densely lineolate on both surfaces, glabrous above, pubescent on the nerves beneath; lateral nerves 10-15 on either half; base narrowed into the petiole, ·5-2 in. long, uppermost pair of leaves almost sessile with a subcordate base. *Flowers* in very elongate lax pubescent racemes (up to 18 in. long). *Calyx* pubescent, ·3 in. long; segments linear. *Corolla* 2-2·2 in. long. *Anther* cells obscurely mucronate. *Capsule* ·1-1·5 in. long. *Seeds* compressed, glabrous, tubercled.

K. & J. HILLS, N. E F. TRACT, CACHAR (Keenan).
Leaves are used as vegetables.

Flrs. 3-9. Fr. Cold season.

M. atroviridis *T. Anders.*

Undershrub; stem up to 10 ft. high. *Leaves* 2-5 by ·6-2 in., elliptic, acuminate, membranous, glabrous; lateral nerves 8-12 on either half, distinct; base narrowed into the petiole; petiole about ·5 in. long. *Flowers* in condensed racemes, about 2 in. long. *Calyx* narrow, pubescent at least at the margin of the segments. *Corolla* rosy, funnel-shaped upwards. *Stamens* 4, glabrous; capsule elliptic, about 1·3 in. long.

KHASI HILLS (upto 3.000 ft.).

Flrs. & Fr. Cold season.

12. PSEUDERANTHEMUM Radlkf.

Shrubs or undershrubs. *Leaves* usually entire, sometimes undulate or crenulate. *Flowers* subserrate, 1-3 in the axils of opposite bracts or in terminal dense or interrupted simple or branched spikes or pedicelled, ternate at the tip of axillary peduncle; bracts and bracteoles small and narrow. *Calyx* 5-fid or partite; segments short, narrow, subequal. *Corolla* tube long, narrow, cylindric, rarely widened at the throat; lobes 5, spreading, subequal. *Stamens* 2, perfect, usually 2 staminodes; anthers ovate or oblong, 2-celled; cells oblong, equal, parallel, connective widened. *Disc* annular or shortly cupular. *Ovary* 2-celled, usually glabrous; style filiform; stigma entire or shortly 2-lobed. *Capsule* oblong, contracted below in a long stipe. *Seeds* compressed, orbicular or subquadrate, smooth or rugose, supported on an acute retinacula.

Corolla tube ventricose distinctly 2-lipped:—
  Corolla white, light purple veined. Leaves glabrous. .. .. 1. *P. indicum.*
Corolla tube cylindric, narrow, obscurely 2-lipped:—
  Corolla purple:—
    Leaves glabrous, obscurely crenulate. Capsule glabrous. .. .. .. 2. *P. crenulatum.*
    Leaves pubescent, entire; Capsule pubescent. .. .. 3. *P. palatiferum.*

1. Pseuderanthemum indicum *A. M. & J. M. Cowan.* Vern. *Diengjathang,* Khasi.

An undershrub up to 15 ft. in height; stem and branches grey to cinnamon coloured; blaze green.

Leaves 2-6 by ·6-2 in., lanceolate or elliptic-lanceolate, acuminate, entire, membranous, glabrous; lateral nerves 4-7 on either half; base narrowed into the petiole, ·3-1 in. long. *Flowers* white, with purple veins in sparsely pubescent racemes. *Calyx* segments linear-lanceolate. *Corolla* 1.4 in. long, ventricose, distinctly 2-lipped; filaments hairy. *Capsule* 1-1·5 in. long, glabrous. *Seeds* orbicular, tubercled, finely pubescent.

K. & J HILLS (upto 4,000 ft.).

Flrs. 2-3. Fr. 4.

2. Pseuderanthemum crenulatum *Radlk.*

An undershrub, glabrous. *Leaves* 4-6 by 1·8-2 in., elliptic or lanceolate, acuminate, obscurely crenulate, membranous, glabrous; lateral nerves 5-8 on either half; base cuneate or acute; petiole ·3-·5 in. long. *Flowers* purplish in terminal lax simple or compound racemes, which often curved and up to 5 in. long; bracts linear. *Calyx* puberulous; segments linear-lanceolate, ·2 in. long. *Corolla* 1-4 in. long, oblong, 2-lipped; tube linear, cylindric.

KHASI HILLS.

No specimen in the Forest Herbarium, Shillong.

3. Pseuderanthemum palatiferum (*Nees*) *Radlk.*

An undershrub 6-8 ft. high; young parts pubescent. *Leaves* unequal-sided, often oblique, 3.5-9 by 1-3 in., elliptic, acuminate, entire, chartaceous, densely lineolate above, sparsely pubescent on the nerves beneath. *Flowers* often clustered in compound panicled spikes. *Calyx* segments linear-pubescent. *Corolla* purplish, 1.3 in. long, oblong, 2-lipped; tube linear-cylindric. *Capsule* about 1 in. *Seed* glabrous.

LAKHIMPUR, KHASI HILLS (upto 3,000 ft.).

Flrs. 2. Fr. 3-4.

Var. levicapsa; leaves more conspicuously lineolate on the upper surface; flowers often slenderer.

LAKHIMPUR, KHASI HILLS.

Flrs. 2.

P. leptanthus (*Clarke*) *Lindau*.—Is a large herb recorded from Mishmi Hills (Griffith).

13. CODONACANTHUS Nees.

Codonacanthus pauciflorus *Nees.*

An erect herb. *Leaves* 2·4 by 1·2 in., elliptic-acuminate, entire, scaberulous above, pubescent on the nerves beneath; lateral nerves slender; base acute or cuneate; petiole ·2-·6 in. long. *Flowers* in long paniculate lax, slender, pubescent racemes. *Calyx* segments triangular, lanceolate, glabrous. *Corolla* pinkish or whitish, glabrous, ventricose, nearly from the base; lobes subequal. *Stamens* 2 perfect, 2 rudimentary. *Capsule* ·5 in., 4-seeded.

DARRANG, KHASI HILLS.

Flrs. 3. Fr. Rainy season.

14. LEPIDAGATHIS Willd.

Herbs or undershrubs. *Leaves* entire or crenate-serrate. *Flowers* sessile (or fascicled spikes), axillary or terminal, usually 1-seeded heads, sometimes opposite and solitary; bracts usually conspicuous; bracteoles smaller. *Calyx* deeply 5-fid; segments unequal, the 2 anterior more or less connate. *Corolla* tubular, suddenly ventricose above the middle, bilabiate, the upper lip erect, 2-fid, lower spreading, 3-lobed, usually spotted. *Stamens* 4, didynamous; anthers 2-celled, cells oblong, parallel, somewhat one above the other. *Ovary* 2-celled; ovules 2 or 1 in each cell. *Stigma* capitellate, minutely 2-fid or entire. *Capsule* elongate, compressed, conoid or oblong. *Seeds* 2-4, compressed, hairy.

Capsule, 4-seeded:—

Leaves entire, linear-lanceolate. Corolla yellowish white, with tomentose marks. ..	1	*L. rigida.*
Leaves caudate-ovate or oblong. Corolla white with brown spots.	2.	*L. incurva.*

1. Lepidagathis rigida *Dalz.*

A rigid gregarious undershrub. *Stem* quadrangular. *Leaves* 2-6 by ·1-·6 in., linear-lanceolate, acute or acuminate,

coriaceous, glandular pubescent; spikes glandular hairy. *Calyx* glandular pubescent. *Capsule* ·3-·4 in. long. *Seed* 4.

GOALPARA.

Flrs. 11-12. Fr. 1-2.

2. Lepidagathis incurva *D. Don.=L. hyalina* Nees. Var. aristata Fischer. Vern *Byiradimat-mengo-kime*, Garo.

Stem wing upto 10·1 in. long. *Leaves* 6 by ·5 in., narrowly elliptic, acute or obtuse, glabrous, shining, dark green above, pale below; lateral nerves 7-9 on either half; base decurrent into the short petiole. *Spikes* dense; bracts and bracteoles aristate, brown or green, about ·4 in. long. *Corolla* white, spotted with brown.

Baghmara (GARO HILLS) upto 2,000 ft.

Flrs. 11.

15. PHIALACANTHUS Benth.

Phialacanthus Griffithii *Benth.*

An erect glabrous shrub. *Leaves* 7.5 by 2.5 in., entire, broad, elliptic-acuminate; bearing raphides on both surfaces; base acuminate; petiole 1·5 in. long. *Cymes* 3 in. across, terminal; peduncles short; pedicels slender, ·25 in. long; bracts minute. *Calyx* coloured, tubular, campanulate, membranous, enlarged in fruit; teeth minute, triangular. *Corolla* 1.75 in. long, orange with yellow mouth, ventricose upwards, limb 2-lipped; lobes 5, subequal, imbricate in bud. *Stamens* 4, glabrous; anthers pubescent. *Style* filiform, glabrous; stigma minutely 2-lobed; ovules 2 in each cell. *Capsule* ·25 in., glabrous, shortly stalked, oblong, 4-seeded.

MISHMI HILLS (ASSAM) Griffith. No specimen in Forest Herbarium, Shillong, F B.I., Vol. IV. P. 523.

16. DICLIPTERA Juss.

Dicliptera Roxburghiana *Nees.*

A diffuse herb from a woody root-stock 6-18 in. high, puberulous. *Leaves* 1·5-4 by ·6-1·5 in., elliptic, rhomboid, lanceolate-acuminate or acute, membranous, glabrate or

puberulous above, thinly pubescent beneath; base cuneate; petiole ·05-1·2 in. long. *Flowers* pinkish, in axillary peduncled bracteate cymes. *Bracts* and calyx glandular pubescent. *Capsule* ·2-·25 in.

N. E. F. TRACT, GARO HILLS, SYLHET ?
It is said to be a useful tonic (Watt). The plant is used medicinally in the Punjab (Stewart).

Flrs. 12-1. Fr. 2-3.

17. JUSTICIA Linn.

Shrubs, undershrubs or herbs. *Leaves* entire, usually lanceolate. *Flowers* sessile or subsessile, in spikes or panicles (rarely solitary); bracts conspicuous; bracteoles small or 0. *Calyx* 5- or 4- partite; segments narrow. *Corolla* 2-lipped; teeth equalling or shorter than the limb; upper lip 2-lobed or subentire, lower 3-lobed; lobes imbricate in bud. *Stamens* 2; filaments often dilated, hairy near the base; anthers 2-celled; cells oblong or rounded, more or less discrete, lower with white basal appendage. *Ovary* 2-celled, 2 ovules in each cell; style filiform; stigma 2-fid. *Capsule* ovoid or obovoid, 4-seeded, either from the base or 4-seeded at the apex with a long seedless base. *Seeds* ovoid, more or less compressed, tubercular, scaly or echinate, not hygroscopically hairy.

Flowers in axillary clusters:—
  Bracts obovate or spathulate:—
    Leaves elliptic acute, puberulous; bracts rusty-pubescent; petiole 3 in. long. .. 1. *J. quadrifaria.*
    Leaves lanceolate-acuminate; bracts glabrate or sparsely pubescent; petiole ·05-·1 in. long. .. .. 2. *J. salicifolia.*
    Leaves linear-lanceolate, glabrous; petiole hardly any. .. .. 3. *J. Neesiana.*
Flowers in terminal spikes:—
  Bracts linear:—
    Leaves lanceolate, glabrous. .. .. 4. *J. Gendarussa.*
  Bracts oblong or linear:—
    Leaves ovate, pubescent on the midrib beneath. .. .. 5. *J. vasculosa.*
Flowers laxly panicled:—
  Seeds echinate:—
    Bracts small, linear or linear-lanceolate:—

Leaves sessile:—
Stem elongate, hispid. .. .. 6. *J. khasiana.*
Stem prostrate. .. .. .. 7. *J. assamica.*
Leaves petioled:—
Bracts elliptic, subacute, broad, clothed with glistening jointed hairs, ovate or oblong. .. .. .. 8. *J. simplex.*
Bracts linear-lanceolate, hairy about half as broad as above, elliptic or lanceolate. .. .. .. 9. *J. procumbens.*

1. Justicia quadrifaria *Wall.*

Branches rusty pubescent. *Leaves* 3·5 by 1·5 in., elliptic, acute at both ends, pubescent on the nerves beneath; petiole ·3 in. long. *Flowers* in dense axillary clusters. *Branchlets* orbicular or emarginate, rusty pubescent. *Calyx* sub-5-partite; segments lanceolate, puberulous. *Corolla* small, hairy, white, rose-spotted; lower anther cell white lobed. *Capsule* ·25 in., 4-seeded, minutely pubescent. *Seeds* tubercular, verrucose, glabrous.

ASSAM (Griffith), K. & J. Hills (3,000 ft.), Wall. No specimen in Forest Herbarium, Shillong, F.B I. Vol. IV. P. 530.

2. Justicia salicifolia *T. Anders.*

An undershrub, 1-2 ft. long. *Leaves* 1·5-5 by ·2-·8 in., lanceolate-acuminate, entire, membranous, sparsely pubescent above, glabrous beneath with numerous raphides. *Flowers* white, in axillary clusters; bracts suborbicular, glabrate. *Calyx* linear, 5-partite; segments linear. *Corolla* ·3-·5 in. long, almost glabrous. *Capsule* ·4 in. long.

KHASI HILLS, (upto 4000 ft.).

Flrs. & Fr. Cold season.

3. Justicia Neesiana *Wall.*

A small undershrub, internodes short. *Leaves* 1·5 by ·25 in., linear-lanceolate, glabrous, almost sessile. *Flowers* in close axillary clusters; bracts spathulate. *Corolla* ·25 in.

KHASI HILLS, (Wallich.).

No specimen in Forest Herbarium, Shillong, F.BI. Vol. IV. P. 531.

4. Justicia Gendarussa *Linn.* Vern. *Titiria-soso-arong,* Mik.; *Tita-bahak, Bishalya-karani,* Ass.; *Dajagipe,* Garo.

An undershrub 2-5 ft. high. *Stem* green, smooth. *Leaves* 2-5 by ·2-1·4 in., lanceolate, bluntly acuminate, undulate or crenulate, sub-coriaceous, pubescent when young, glabrous on maturity; lateral nerves slender, distant, 5-7 on either half; base acute or cuneate; petiole ·1-·5 in. long. *Flowers* white with purple spot inside, in interrupted spikes often forming terminal panicles; bracts linear, about ·12 in. long. *Calyx* about ·2 in. long; segments linear. *Corolla* about ·5 in. long. *Capsule* ·5 in., glabrous.

LAKHIMPUR, SIBSAGAR, KAMRUP, K. & J. HILLS—upto 5,000 ft.

Flrs. 2-5.

5. Justicia vasculosa *Wall.*

Herbaceous, about 2 ft. high, with perennial root-stock. *Leaves* 3-7 by 1·5-3 in., ovate-acuminate, entire, membranous, scaberulous above, pubescent on the midrib beneath; base alternate on the petiole ·5-1·8 in. long. *Flowers* solitary, opposite in simple or paniculate spikes; bracts oblong. *Calyx* segments lanceolate. *Corolla* ·5-·6 in. long, dull white with purple.

SIBSAGAR, KHASI HILLS.

Portion of leaves is used for inflammation.

Flrs. 10-12. Fr. 1-2.

6. Justicia khasiana *Clarke.*

Stem quadrangular, hispid, rather herbaceous. *Leaves* 1-1·5 by ·2-·4 in., elliptic-oblong or lanceolate, acute, membranous, hispid; base rounded; petiole slender, short, linear-oblong, hispid. *Spikes* hispid, scarcely interrupted. *Calyx* segments hispid. *Capsule* ellipsoid.

KHASI HILLS, (5000 ft.).

Flrs. 8.

7. Justicia assamica *Clarke.*

Stems 4-5-angled, glabrous. *Leaves* 1·5 by ·3 in., oblong, sessile. *Calyx* white, setulose. *Capsule* ellipsoid.

KHASI HILLS, (5000 ft.)—Griffith.

(No specimen in Forest Herbarium, Shillong. F.B.I. Vol. IV. P. 537)

8. Justicia simplex *Don Prodr.*

A slender herb 6-20 in. high. *Leaves* ·5-2 by ·2-·8 in., ovate or elliptic-oblong, lanceolate; bracts elliptic, subacute, about ·08 in. broad, clothed with jointed glistening hairs.

LAKHIMPUR.

Flrs. 1.

9. Justicia procumbens *Linn.* Var. latispica Clarke.

A diffuse herb. *Leaves* variable, 1-5 by ·5-1·5 in., elliptic or lanceolate; bracts linear, hispid, lanceolate, hairy, about ·04 in., broad.

KHASI HILLS.

Flrs. 11.

18. ADHATODA Nees.

Adhatoda vasica *Nees.* Vern. *Bakas, Basak, Vasaka,* Beng.; *Bahaka,* Ass.

An evergreen gregarious shrub 4-8 ft. high with fœtid smell. *Bark* smooth, pale brown; young parts pubescent. *Leaves* 2·5-8 by 1-3 in., elliptic or lanceolate, acuminate, entire or undulate, subcoriaceous, minute, pubescent; lateral nerves 8-12 on either half; base abruptly narrowed into the petiole ·5-1·5 in. long. *Flowers* white in dense, bracteate, peduncled spikes 4-6 in. long, axillary, solitary or terminal together at the ends of branches. *Bracts* conspicuous, ovate or obovate, often mucronate, ·7 by ·5 in.; bracteoles narrower. *Calyx* ·3-·5 in. long, deeply 5-fid; segments oblong-acuminate, pubescent on the margin and at the apex inside. *Corolla* 1-1·3 in. long; tube hairy outside with short basal portion, slightly dilated in the middle; the upper portion

thin, inflated; throat usually with 2 lines of purple or yellow leaves, upper lip curved, notched at the apex; lobes of lower lip rounded. *Stamens* 2; filaments hairy at the base only; anther-cells minutely pointed at the base. *Ovary* hairy; ovules 2 in each cell. *Capsule* ·75 in. long, clavate, longitudinal, channelled, pubescent, 4-seeded. *Seed* ·2 in. long, suborbicular, compressed, tubercled.

Common throughout the province.

The plant is considered very efficacious in preliminary diseases and possesses other medicinal properties. It has also undoubted antiseptic properties.

The plant is said to be good insecticide.

Flrs. 12-4. Fr. 2-5.

19. RHINACANTHUS Nees.

Rhinacanthus calcaratus *Nees.*

A shrub with stout branches. *Leaves* 3·5-8 by 1·2-3 in., elliptic-acuminate, entire, glabrous; lateral nerves 12-14 on either half, almost parallel, arcuate; base narrowed into the petiole ·5-1 in. long. *Flowers* in terminal panicles. *Calyx* 5-partite, almost glabrous; segments linear-lanceolate. *Corolla* white, 2-lipped, about 2 in. long. *Stamens* 2, inserted near the top of the tube; anthers 2-celled; cells superposed. *Capsule* clavate, 4-seeded, basal portion long, solid.

KHASI HILLS, CACHAR, LAKHIMPUR (U. D. Resonus).

Flrs. 3.

20. ECBOLIUM Kurz.

Ecbolium Linneanum *Kurz.*

A small undershrub with a woody root-stock. *Leaves* 4-6·5 by 1·5-3 in., elliptic-lanceolate or oblanceolate, bluntly acuminate or acute, sinuate, glabrate with age, dark green above; lateral nerves 5-7 on either half; base tapering into a short petiole, ·2-·7 in. long. *Flowers* bluish in dense terminal spikes. *Bracts* yellowish-green, ·6-·75 in. long. *Calyx* 5-partite; segment broadly subulate. *Corolla* 2-lipped, hairy outside. *Stamens* 2, staminodes 0; anther-cells subequal, muticous. *Ovary* pubescent, 2-celled; ovules 2 in each cell.

Capsule upto 8 in. long, upper portion ·5 by ·3 in., broad-ovate, acute, abruptly narrowed to a solid stripe. *Seed* usually 1 in each cell.

NOWGONG.
The roots are prescribed in jaundice.

Flrs. & Fr. 11-4.

21. SPHINCTACANTHUS Benth.

Sphinctacanthus Griffithii *Benth.*

An erect glabrous shrub. *Leaves* 7·5 by 3·5 in., toothed or subentire, acute; base acute; petiole 1 in. *Flowers* opposite in interrupted spikes forming a panicle. *Calyx* ·1 in., sub-5-partite; segments linear. *Corolla* tube ovoid, inflated, constricted at top; limb 2-lipped; upper emarginate, lower 3 lobed. *Stamens* 2; anthers 2-celled. *Ovary* 4-ovulate; style linear, minutely bifid. *Fruit* unknown.

MISHMI HILLS (ASSAM) Griffith

No specimen in Forest Herbarium, Shillong, F.B.I. Vol. IV. P. 544.
The undermentioned plants are also recorded from the region of the flora :—

Hytrophila polysperma *T. Ander.*

An annual, procumbent, 6-18 in. long. *Leaves* ·5-1 by ·2-4 in., ovate or oblong, nearly entire, sparsely puberulous. *Flowers* in dense terminal spikes. *Calyx* 5-partite. *Corolla* slender, pubescent. *Stamens* 2, perfect. *Capsule* linear, ·3 in. long, many seeded.
KAMRUP.

Flrs. 4. Fr. 11.

Rungia stolonifera *Clarke.*

A small undershrub, rather herbaceous, 1-2 ft. high. *Leaves* 1·2·5 by ·5 in., ovate, scabrid; petiole ·3-1 in., slender. *Flowers* bright lurid blue; lip of corolla marked with bright white veins. *Stamens* 2; anthers spurred; style filiform, glabrous. *Capsule* ovoid, glabrous. *Seeds* 4, compressed.
KHASI HILLS.

Flrs. 9.

R. khasiana *T. Anders.* R. parviflora *Nees* are also in record.

The root of R. paviflora is used as a specific by Santals and is also used in Bombay to adulterate fermentary (*I. M. P*)

Peristrophe fera *Clarke.*

A herb rather woody. *Leaves* 2-4 by ·6-1·3 in., ovate-lanceolate, acuminate, pubescent; petiole ·5-1·2 in. long. *Flowers* purple with only one lanceolate lobe. *Stamens* 2; anther-cells one slightly above the other; filaments hairy. *Capsule* ellipsoid, 4-seeded.
KHASI HILLS.

Flrs. 11.

P. bivalois (*L.*) *Merr.*=P. tinctoria Nees.
Leaves 1-2·5 by ·5-·8 in., ovate, puberulous; petiole ·1-·3 in. long. *Bracts* elliptic. *Corolla* 1·25 in., slender
Cultivated.

FAM. 100. VERBENACEÆ.

Shrubs, trees or herbs, sometimes scandent, commonly fœtid or aromatic. *Leaves* opposite or whorled, usually simple, less often digitate, exstipulate. *Flowers* harmaphrodite or polygamous, zygomorphic, often showy, usually in variously formed inflorescence, less often racemose inflorescence, sometimes collected in heads. *Calyx* inferior, gamosepalous, persistent, usually 4-5- (rarely 6-8) partite or toothed, sometimes bilabiate, rarely truncate. *Corolla* 2-lipped or subequally 4-5 lobed, rarely more. *Stamens* 4, didynamous, less often equal, rarely 2, rarely more, inserted on the corolla tube; filaments free; anthers 2-celled. *Disk* inconspicuous. *Ovary* usually 2-4-celled, entire or lobed; style terminal; stigma usually bifid; ovules 1-2 in each cell. *Fruit* drupaceous with a 4-celled endocarp or 4 pyrenes (or fewer by abortion) or partially connate drupes, less often dry or capsular 4-or 2-valved. *Seeds* 1 in each cell, usually exalbuminous; embryo straight; radicle inferior.

Inflorescence with lowest flowers opening first, (centripetal) densely spicate:—
Pyrenes or drupe 2 or 1, 1-seeded. Flowers sessile; spike capitate:—

Calyx truncate or densely toothed. Fruit succulent. .. .. **1. Lantana.**
Calyx 2-4-fid. Fruit dry; spike long, slender. **2. Lippia.**
Calyx long, tubular; spike terminal elongate, slender. .. .. .. **3. Stachytarpheta.**

Inflorescence cymose with end flowers opening first (centrifugal):—
Cymes paniculate. Drupe fleshy:—
Flowers more or less regular:—
Flowers 4-merous. Drupe with (1-4) pyrenes. Calyx less accrescent in fruit. **4. Callicarpa.**
Flowers 4-6-merous. Drupe with 4-celled endocarp. Calyx accrescent in fruit. .. **5. Tectona.**
Flowers zygomorphic:—
Corolla 2-lipped. Stamens 4, didynamous:—
Leaves simple:—
Flowers large .. .. .. **6. Gmelina.**
Flowers small. .. .. .. **7. Premna.**
Leaves digitate. Drupe with 4 (-1) celled endocarp .. .. .. **8. Vitex.**
Leaves simple. Fruit with 4, 1-seeded pyrenes:—
Corolla tube slender. Calyx campanulate. .. .. .. **9. Clerodendron.**
Corolla widened upwards. Calyx petaloid. .. .. .. **10. Holmskioldia.**
Cymes panicled. Fruit of 4 slightly winged pyrenes. Calyx deeply 4-6-fid. Leaves simple, shrub. .. .. **11. Caryopteris.**
Cymes capitate with an involucre of large bracts. Corolla 5-6 merous. Stamens included or shortly exserted, large. Climbers. .. **12. Sphenodesma.**

1. LANTANA Linn.

Shrubs, erect or subscandent, pubescent, scabrous or prickly, often rambling, strongly aromatic; branches 4-angled. *Leaves* simple, opposite or truncate, crenate, often rugose. *Flowers* in pedunculate capitate, ovoid or cylindrical spikes; bracts persistent, exceeding the calyx; bracteoles 0. *Calyx* small, membranous, truncate or obscurely toothed. *Corolla* 4-5-lobed; tube slender; lobes spreading. *Stamens* 4, didynamous, included; anthers oblong. *Ovary* 2-celled; style short, stigma oblique, sub-capitate; ovules solitary in each cell. *Fruit* drupaceous with more or less fleshy mesocarp

containing 2 bony 1-seeded pyrenes. *Seeds* exalbuminous; radicle inferior.

Stems not prickly:—
Leaves sometimes ternate, sparingly scaberulous beneath; bracts-ovate or elliptic-ovate, 7-ribbed. .. .. *1. L. indica.*
Stems with many recurved prickles:—
Leaves opposite, whitish tomentose beneath; bracts lanceolate, 3-5-ribbed. .. .. *2. L. aculeata.*

1. Lantana indica *Roxb.*

An erect shrub 3-8 ft. high; branches pubescent, rambling. *Leaves* opposite, sometimes ternate, 1-3 by ·75 in., ovate-acute, crenate, coriaceous, rugose and hairy with bulbous-based hairs above and usually whitish tomentose beneath; base rounded or cuneate; petiole up to ·5 in. long. *Flowers* very faintly scented, pink or purplish with a yellowish tube; bracts ovate, 7-ribbed. *Fruit* purple when ripe, ·15-·2 in. across, enclosed by the membranous calyx.

Plains of ASSAM.
Leaves are regarded as a cure for snake bite (Duthie).

Flrs. 4-5. Fr. 9-10.

2. Lantana aculeata *Linn.* Syn. L. Camara Linn.

A straggling shrub, very aromatic (black currant smell); stems with many recurved prickles. *Leaves* opposite, 1-3·5 by ·5-1·5 in., ovate or obovate, oblong, acute, crenate, rugose, sparingly scaberulous; base cuneate, rounded or cordate; petiole ·2-·4 in. long. *Flowers* usually orange, varying to white or dark purple; bracts lanceolate, 3-5-ribbed; spikes subumbellate. *Fruit* ·2 in. across, greenish-blue when ripe.

KHASI HILLS, and plains of ASSAM.
Introduced from tropical America and runs wild now. It is an invasive pest and tends to overrun forest areas to the exclusion of anything else. Once established, its eradication is very difficult and expensive.

Flrs. and Fr. Nearly all the year round.

2. LIPPIA Linn.

Lippia geminata *H. B. & Kunth.* Vern. *Pichas-lakri, Pichas-bon,* Sylh.; *Lopong-brik,* Mik.

A gregarious strongly aromatic shrub; branches slender, obscurely angled, hairy. *Leaves* 3-5 by ·3-1 in., ovate-lanceolate or lanceolate, crenulate or crenate, serrate, acute, rugose, hairy and punctate above, pubescent beneath; base cuneate; petiole ·2-·4 in. long. *Flowers* pink, scented, in dense peduncled cylindric subcapitate spikes elongating up to 1 in.; bracts ovate-acuminate, white, villous. *Calyx* silky. *Corolla* hairy, yellowish. *Stamens* 4, didynamous, enclosed. *Ovary* 2-celled; ovules solitary in each cell; stigma oblique, subcapitate. *Fruit* ·08 in. across, with a dry epicarp splitting into 1-2-seeded pyrenes.

N. E. FRONTIER TRACT, KAMRUP, GOALPARA, SIBSAGAR, NOWGONG, K. & J. HILLS.

Leaves are used as vegetables in KHASI HILLS.

Flrs. 2-3, but apparently flrs. & frt. nearly all the year round.

L. citriodora *H.B. & K.*, is the lemon scented Verbena, native of S. America, commonly planted in gardens.

3. STACHYTARPHETA. Vahl.

Stachytarpheta jamaicensis (*L.*) *Vahl*=Stachytarpheta indica Vahl Enum.

A perennial, about 3 feet high; branches mostly dichotomous. *Leaves* 1·3·5 by ·5-1·5 in., elliptic, ovate-elliptic, acute or obtuse, serrate or cuneate, dentate, almost glabrous; base cuneate or decurrent; petiole ·1-·6 in. long. *Flowers* bluish, sessile, adpressed on rachis of terminal spikes and nestled in the depression enclosed by the bracts. *Stamens* 2, perfect; staminodes 2. *Ovary* 2-celled; style elongate; ovule solitary in each cell. *Fruit* ·12-·17 in. long, dry, enclosed in the calyx tube separating into 2 hard 1-seeded pyrenes.

KHASI HILLS, GOALPARA, SIBSAGAR, DARRANG.

Flrs. Rainy season. Fr. 11.

S. mutabilis *Vahl.*—Native of tropical America. A shrub, often grown in garden

Verbena officinalis *Linn.*—A perennial herb. *Branches* angular with woody root-stock. *Leaves* 1-4 by ·8-2 in., sub-sessile, ovate, or oblong or pinnatifid, puberulous. *Flowers* lilac in elongating spikes. *Fruit* included in the calyx; pyrenes 4 (or fewer), truncate, 3-ribbed.

KHASI HILLS (5000 ft.).

Flrs. Rainy season. Fr. Cold season.
Many Verbenas are beautiful garden plants.

Duranta Plumieri *Jacq.*—A large usually thorny shrub with drooping branches. *Leaves* ·5-1·3 by ·3-·7 in., obovate or elliptic-acute, entire or partially serrate, almost glabrous; base narrowed into the petiole ·1-·3 in. long. *Stamens* didynamous, included. *Ovary* 8-celled; stigma unequally 4-fid. *Fruit* a drupe, succulent with 4 hard 2-celled, 2-seeded pyrenes.

KHASI HILLS & PLAINS OF ASSAM. Cultivated.
Makes an excellent hedge.

Flrs. & Fr. Most of the year

4. CALLICARPA Linn.

Shrubs or trees; young parts stellately tomentose. *Flowers* small, often glandular, in peduncled dense dichotomous cymes, shorter than the leaves. *Calyx* very small, not enlarged in fruit, 4-toothed. *Corolla* small, tubular-campanulate, lilac, purple or red, usually 4-(5-) lobed; lobe subquadrate, spreading. *Stamens* 4 (5) exserted; anthers glandular on the back. *Ovary* imperfectly 2-celled; style linear; stigma obscurely 2-fid; ovules 2 in each cell. *Fruit* a globose drupe supported by the calyx containing 1-4, 1-seeded pyrenes. *Seeds* exalbuminous.

Petiole long, exceeding 1 in.:—		
Leaves entire or sub-entire; petiole upto 2 in. long:—		
Leaves entire; calyx stellately pubescent.	1.	*C. arborea.*
Leaves sub-entire; calyx almost glabrous in flower.	2.	*C. vestita.*
Petiole short, not exceeding 1 in.:—		
Leaves closely crenate; petiole ·3-·1 in. Drupe white.	3.	*C. macrophylla.*
Leaves crenate-serrate; petiole ·05-·3 in. Drupe purple.	4.	*C. rubella.*
Leaves denticulate; petiole ·1-·3 in. Calyx glandular, scarcely hairy.	5.	*C. psilocalyx.*

Leaves serrulate; petiole ·2-·5 in.	Calyx		
stellately white, tomentose. ..	..	6.	*C. longifolia.*
Leaves denticulate; petiole ·1-·3 in.	..	7	*C. acuminata.*

1. Callicarpa arborea *Roxb.* Vern. *Mojonthi-phang,* Kach.; *Mai-phia,* Kuki; *Dieng-lakhiot,* Khasi; *Arhi-arong,* Mik.; *Khimbar, Maskhanchi,* Garo; *Phoja,* Jharua; *Gunmola, Maksi, Bonmola, Mach-kotta, Mach-peluka,* Ass.; *Mukhuang,* Naga; *Maiphi-thing, Tipp.; Selu,* Miri; *Yarphu-changne,* Duff.; *Saiom,* Manip.; *Maiphi,* Lushai; *Dhola-uja,* Cach.

A small evergreen tree. *Bark* sometimes corky, brown, grey or darkish, rough with shallow fissures. *Blaze* yellowish brown, broader streaks turning darker with irregular strands of chocolate brown; innovation scruffy; undersurface of leaves, petiole and inflorescence stellate-tomentose. *Leaves* 3-12 by 1·5-5 in., elliptic-lanceolate, oblong or ovate-lanceolate, acuminate, entire or nearly so, coriaceous, glabrescent above, fairly stellate tomentose beneath; lateral nerves 8-12 on either half; base acute or cuneate; petiole ·5-2 in. long; cymes 2-5 in. across; peduncles up to 2 in. long. *Calyx* subtruncate, stellate-pubescent. *Corolla* ·15 in. long, purplish. *Drupe* ·1 in. across, purple, when ripe.

Common throughout the Province.

Poles are used as rollers of Synteng looms. Bark is chewed with betel leaf. Leaves are fodder for buffaloes.

The species has a tendency to become gregarious, apparently very useful in covering bare hill sides, *e.g.*, in jhummed areas.

Flrs. 5-10. Fr. End of rainy season and cold season.

C. arborea Var. oblongifolia also occurs in the region of the flora.

2. Callicarpa vestita *Wall.* Vern. *Yarphu-changne,* Duff.

A small tree or shrub. *Bark* dark brown, warty; young shoots very shaggy with brown tomentum. *Leaves* 6-13 by 3-6 in., ovate-acuminate, sub-entire, coriaceous, glabrous above, thickly silky white, tomentose beneath; lateral nerves 8-12 on either half, sub-parallel, arcuate; base rounded or sometimes shallow cordate; pteiole 1-2·2 in. long, brown, tomentose. *Inflorescence* in axillary brownish pubescent cymes; peduncles about 2 in. long, stellately pubescent.

Calyx almost glabrous in flowers. *Corolla* pinkish or pale purple, about ·1 in. long, rather glabrous. *Fruit* a small globose drupe, about ·1 in. in diameter.

DARRANG, KHASI HILLS.
Bark is chewed like that of *Careya arborea* by the Dufflas.

Flrs. 4.

3. Callicarpa macrophylla *Vahl.* Vern. *Gupora-asing*, Miri; *Bonmala, Tong-loti*, Ass.; *Sam-mojonti*, Kach.; *Chapite-rakal*, Kuki.

A large spreading shrub; young parts and inflorescence stellately woolly. *Bark* brown, thin, smooth. *Leaves* 3-8·5 by 1·2-3 in., oblong-elliptic or ovate-lanceolate, acuminate, crenate or crenate-dentate, coriaceous, glabrate or fairly pubescent above, densely stellate-tomentose. beneath; lateral nerves 10-16 on either half; base acute or truncate; petiole ·5-1·25 in. long. *Flowers* rose pink in dense dichotomous cymes, ·2 in. across; peduncle upto 1 in. long. *Calyx* ·1 in., stellate-pubescent, glabrate with age; teeth minute. *Corolla* lobes subequal, spreading. *Drupe* ·12-·18 in. across. white.

DARRANG, SIBSAGAR, N.-E. F. TRACT, NOWGONG, N. C. HILLS, GOALPARA, KHASI HILLS (5,000 ft.).
Poultice of bark is applied for headache.

Flrs. & Fr. Practically throughout the year.

4. Callicarpa rubella *Lindl.* Vern. *Soh-eitksar, Jalang-koai*, Khasi; *Dieng-la-khangwet, Dieng-lakso-niaw*, Synt.

An erect shrub; stem whitish, 15-20 in. long. *Leaves* 2·7 by ·8-2 in., oblong-lanceolate or obovate-lanceolate or elliptic-lanceolate, acuminate, crenate-serrate, coriaceous, hairy above, tomentose beneath. *Flowers* red in stellately tomentose cymes, 1-2 in. across. *Calyx* stellate-tomentose in flower. *Drupe* ·12-·18 in. across, purple.

KHASI HILLS (5,000 ft.).
Bark and root are chewed like betel-nuts.

Flrs. Rainy season. Fr. Cold season.

5. Callicarpa psilocalyx *Clarke.* Vern. *Pylleng-tham. Dieng-soh-sim-um,* Khasi.

A small tree or a shrub with straggling branches; extremities stellate-pubescent. *Leaves* 1·5-7·5 by ·7-2·5 in., elliptic-lanceolate, acuminate, denticulate or serrate, membranous; midrib and the nerves hairy, conspicuously stellate-hairy along the nerves beneath, minutely gland-dotted: lateral nerves 4-7 on either half, arcuate; base rounded or cuneate; petiole ·2-·4 in. long. *Flowers* in few flowered cymes, ·5 in. across. *Calyx* greenish or pinkish, 4-toothed, glan-dotted. *Drupe* ·1 in. across, white.

KHASI HILLS.

Flrs. 6. Fr. 8-9.

6. Callicarpa longifolia *Lamk.* Var. lanceolarium F. B. I. Vern. *Dieng-soh-kait-lang,* Khasi.

A shrub up to 15 ft. high; young parts densely stellate-pubescent; stem whitish, smooth. *Leaves* 2-8 by ·6-2 in., narrow-lanceolate, elliptic, elliptic-lanceolate, acuminate, serrulate, membranous, glabrate above dotted with numerous minute glands beneath, stellately pubescent along the nerves; lateral nerves 10-13 on either half; base cuneate; petiole ·2-·8 in. long. *Flowers* rose or purple on spreading somewhat lax cymes upto 1·5 in. across; pedicels glandular, specially at the junction with the calyx. *Calyx* glabrate, truncate. *Corolla* ·1 in. across; lobes subequal. *Drupe* ·1 in. across, white.

GOALPARA, SIBSAGAR, KHASI HILLS (3,000 ft.).

Flrs. Rainy season. Fr. Cold season.

7. Callicarpa acuminata *Roxb.*

A tawny stellately tomentose shrub. *Leaves* 4·5-6 by 1·2-2·2 in., oblong, ovate-lanceolate or elliptic-lanceolate, acuminate, denticulate, membranous, scaberulous above and stellate, tomentose beneath, becoming more or less glabrate when mature, specially in upper surface; lateral nerves

6-8; base usually cuneate; petiole ·1-·3 in. long. *Flowers* in axillary dichotomous panicled cymes.

KHASI HILLS.

Flrs. Rainy season.

5. TECTONA Linn. f.

1. Tectona grandis *Linn.* Teak. Vern. *Segun,* Beng.

A large deciduous tree, often fluted near the base. *Bark* pale brown, grey, striate, fibrous, peeling off in thin strips; branchlets 4-angled, channelled, stellate-pubescent. *Leaves* 6-24 in. long, broadly elliptic or obovate, entire, rough above, stellate-tomentose beneath; main lateral nerves 8-12 on either half; base cuneate; petiole 1·5-2·5 in. long, flattened. *Flowers* white, about ·25 in. across, in large terminal pubescent panicles of cymes 2 3 ft. long, with decussate branching; bracts lanceolate, oblong-acute. *Calyx* in flower campanulate, stellate-tomentose, ·12 in. long, teeth 5-6, spreading, minute, much enlarging in fruit and forming an inflated sparingly pubescent covering to it about 1 in. across. *Corolla* funnel-shaped; tube short; lobes 5-6, subequal, spreading, imbricate in bud. *Stamens* 5-6, inserted near the base of the corolla tube, exserted. *Ovary* densely hairy, 4-celled; ovules solitary in each cell; stigma shortly bifid. *Fruit* a subglobose drupe, ·5-·7 in. across, with thick shaggy exocarp of matted hairs, endocarp hairy. *Seeds* 1-4, exalbuminous.

Cultivated in the plain districts of ASSAM. There is a fairly big old plantation in Kulsi (KAMRUP). Also a small old plantation at Margherita (R. N De).

Teak timber is too well-known to need any description.

Flrs. 7-8. Fr. Cold season.

6. GMELINA Linn.

1. Gmelina arborea *Linn.* Vern. *Gammari,* Kach.; *Dieng-lophiang,* Khasi; *Gambari,* Mech.; *Bol-gippok,* Garo; *Gamri,* Jharua; *Phang-arong,* Mik.; *Gomari,* Ass.; *Gamair,*

Sylh.; *Thlan-vong*, Lushai; *Wang*, Manip.; *Anvong*, Kuki; *Imbeh-ching*, Naga.

A deciduous tree. *Bark* dark grey or ashy, warty with lenticular tubercles, exfoliating in irregular plates which leaves shallow depressions; blaze greenish white, turning brown, green below the cuticle; young parts densely tomentose. *Branchlets* nearly pubescent, quadrangular. *Leaves* 3-8 by 2·5-6 in., broadly ovate-acuminate, subcoriacious, glabrescent above, fairly tomentose or almost glaucous beneath; lateral nerves 6-10 on either half, lowest sub-basal; base subcordate or truncate, often abruptly cuneate and usually with 2 glands at the junction of the puberulous petiole 1-4·5 in. long. *Flowers* 1 in. across, brownish-yellow, in decussate cymes arranged on a terminal tomentose panicles up to 12 in. long; bracts linear-lanceolate. *Calyx* ·2 in. long, cupular or funnel-shaped, pubescent, persistent in fruit; teeth 5, acute. *Corolla* pubescent with crenulate margin. *Stamens* 4, didynamous. *Ovary* 4-celled; style slender; stigma unequally bifid; ovules solitary in each cell. *Drupe* succulent, ovoid or pyriform, about 1 in. long, glossy and yellow when ripe; pulp aromatic; endocarp bony. *Seeds* 1-3, lenticular, exalbuminous; cotyledons fleshy.

Common throughout the Province.

Wood greyish or yellowish white, close and even grained, light, seasons well, easily workable and takes a fine polish, strong and durable. Excellent timber for furniture, planking and many other purposes.

The fruit, root and bark are used in Hindu medicine.

The juice of the leaves is used to remove fœtid discharges from ulcers. (*I.M.P.*).

Flrs. 2-4. Fr. 5-7.

7. PREMNA Linn.

Trees or shrubs, sometimes scandent, rarely herbaceous. *Leaves* opposite or ternate, entire or toothed. *Flowers* small, often polygamous, white or greenish in panicled or corymbose cymes. *Calyx* truncate or minutely 2-5-toothed, occasionally lipped. *Corolla* small; tube short, hairy inside; limb 2-lipped or sub-equally 4- or 5-lobed. *Stamens* didynamous;

anther-cells parallel or divergent. *Ovary* 2- or 4- celled, 4-ovuled; style linear; stigma shortly bifid. *Fruit* a small drupe seated on the calyx, globose or obovoid, with 1-4-celled stone; endocarp rugose or verrucose, usually with 2 basal cavities in the centre. *Seeds* oblong, exalbuminous; cotyledons flat.

Inflorescence elongate, thyrsoid :—
Leaves upto 4·5 by 2 in.; petiole ·2-·6 in. Calyx glabrate, lobed half way down into 2-rounded lobes or sub-truncate:—
A small tree often epiphytic. .. .. 1. *P. racemosa.*
Leaves upto 9 by 4.75 in.; petiole ·1-·16 in., sparsely pubescent outside. Calyx cup-shaped with 2-rounded lobes. Corolla hairy on the throat:—
A shrub or a small tree of en climbing. .. 2. *P. interrupta.*
Leaves upto 6 by 2·5 in.; petiole ·1-·3 in. Calyx densely puberulous, lips obscurely toothed. Corolla hardly hairy at the throat:—
A tree. .. .. 3. *P. bracteata.*
Leaves 2·5-8 by 1-3 in.; petiole ·5-1·5 in. Calyx obscurely 2-lipped, 5-toothed, stellately tomentose. Corolla lobes stellately tomentose without:—
A large shrub. .. .. .. 4. *P. punduana.*

Inflorescence corymbiform:—
Leaves entire or undulate. Corolla 2-lipped or entire:—
Leaves usually glabrous; petiole upto 1·5 in.:—
Leaves coriaceous, sub-cordate, greenish yellow. Corolla tube twice the length of the calyx, hairy within near the lower part:—
A shrub. .. .. .. 5. *P. cordifolia.*
Leaves coriaceous, cordate. Corolla tube white, not twice the length of the calyx, hairy at the throat:—
An extremely straggling or climbing shrub. .. .. .. 6. *P. coriacea.*
Leaves membranous; base rounded or cuneate. Corolla bearded at the throat. Calyx cup-shaped, nearly entire:—
A large climbing shrub. .. .. 7. *P. scandens.*

Leaves cordate-acuminate; base obtuse. Corolla glabrous without; throat somewhat hairy. Calyx 2-lipped, obscurely 5-toothed:—
A subscandent shrub. .. . 8. *P. khasiana.*

Leaves acute, obtuse or sub-cordate. Petiole upto 2·5 in. long. Corolla greenish white, hairy in the throat. Calyx 2-lipped, lower lip distinctly 3-toothed:—
A tree. . .. . 9. *P. longifolia.*

Leaves oblong-ovate or broad-elliptic, 2-4 by 1-2·5 in.; base rounded or sub-acute. Petiole ·4-·7 in. long. Corolla yellowish green, sub-equally 4-lobed. Calyx 2-lipped; one-lip 2-toothed, the other sub-entire:—
A small tree or shrub; large branches often thorny. .. .. .. 10. *P. corymbosa.*

Leaves hairy or tomentose. Calyx 4-5 toothed:—
Hairs stellate:—

Leaves 4-8 by 3-5 in.; petiole 1·5-3 in. long. Corolla stellately villous within. .. 11 *P. pyramidata.*

Leaves 3-10 by 1·5-4 in., petiole ·5-1·75 in. long. Corolla throat hairy .. .. 12. *P. bengalensis.*

Hairs as a rule not stellate:—
Leaves glabrous above; base rhomboid; lateral nerves 8-11 on either half. Petiole upto 4 in long .. .. .. 13. *P. milleflora.*

Leaves glabrescent above; base cuneate or rounded, sometimes shallow cordate; lateral nerves 6-8 on either half; petiole upto ·8 in. long. .. .. .. 14. *P. latifolia.*

Leaves setulose above; base rounded; petiole upto 1·5 in. long. .. .. 15. *P. micrantha.*

Inflorescence corymbiform or pyramidal:—
Leaves usually dentate or serrate; petiole about 1 in.:—

Calyx sub-equally 4-toothed, enlarged and ribbed in fruit. Corolla hairy at the throat :—
A small tree or shrub. .. .. 16. *P. barbata.*

Calyx sub-equally 5-toothed, glandular. Corolla glabrous:—
Low undershrub. .. .. 17. *P. pinguis.*

Leaves shortly petioled; petiole about ·25 in. long; bracts minute:— Calyx cup-shaped, minutely 5-toothed. Corolla throat hairy:— A branching shrub. ..	*18.*	*P. esculenta.*
Leaves sessile; bracts ·25 in. long:— Calyx enlarged in fruit, deeply 2-lipped:— A low undershrub.	*19.*	*P. macrophylla.*
Leaves sessile. Calyx cupular, sub-equally 4-toothed. Corolla throat hairy. ..	*20*	*P. herbacea.*

1. Premna racemosa *Wall.* Vern. *Dieng-thalap*, Khasi.

A small tree, occasionally epiphytic. *Bark* greyish brown, rough, granular, ·12 in. thick; blaze light red. *Leaves* 1·5-4·5 by ·8-2 in., ovate, obovate- or elliptic- oblong, acute or acuminate, obscurely crenulate, membranous, almost glabrous, sometimes sparsely pubescent along the nerves; lateral nerves 4-5 on either half; base cuneate or decurrent; petiole ·2-·5 in. long. *Flowers* whitish, scented, in interrupted spiciform cymose clusters upto 3·5 in. long. *Calyx* glabrate, bilabiate. *Corolla* ·16 in. long, whitish, 4-lobed, hairy within. *Filaments* hairy at base. *Ovary* almost glabrous at the apex. *Drupe* ·16 in. long, narrowly obovoid.

K. & J. HILLS (5,000 ft.).
Flrs. 4-6. Fr. 7-9.

2. Premna interrupta *Wall.*

A shrub or small tree, sometimes climbing (Gamble); young parts pubescent. *Leaves* 4-8 by 2·4·5 in., obovate or ovate, shortly acuminate, entire, subcoriaceous, glabrous; lateral nerves 6-8 on either half; base narrowed into the petiole ·1-·16 in. long. *Flowers* sessile, in compact almost sessile cymes arranged in long terminal cylindrical spike usually interrupted towards the base; bracts lanceolate, foliaceous, about ·5 in. *Calyx* of two small thick segments. *Corolla* throat hairy; lobes short, oblong. *Stamens* 4, exserted. *Ovary* 4-celled.

KHASI HILLS (Brandis P. 509).
Flrs. 6-7.

3. Premna bracteata *Wall.* Vern. *Dieng-ladi-um*, Khasi.

A tree, having an epiphytic tendency. *Bark* ashy, granular, ·25 in. thick, plain; blaze cream-coloured with brown vertical lines. *Leaves* 2-6 by 1.3-2·5 in., elliptic, ovate-elliptic or obovate-elliptic, subentire, acuminate, glabrous; lateral nerves 7-8 on either half; veins conspicuous, reticulated beneath; base cuneate; petiole ·1-·3 in. long, somewhat marginate. *Flowers* whitish, cymosely clustered in panicled spikes. *Calyx* puberulous. *Corolla* ·12 in., not hairy at the throat.

K. & J. HILLS 4000 ft. (Kanjilal's No. 6715).
Flrs. 3-6.

4. Premna punduana *Wall.* Vern. *Gohora*, Ass.

A large shrub or a small tree, grows upto 4-5 ft. in girth; young parts stellate tomentose. *Leaves* 2.5-8 by 1-3 in., ovate-oblong, elliptic or elliptic-oblong, entire, acuminate, thinly coriaceous, pubescent along the midrib above, stellate tomentose beneath; lateral nerves 7-9 on either half; base obtuse or rounded; petiole ·5-1·5 in. long. *Flowers* in large terminal thyrsoid paniculate cymes. *Calyx* 5-toothed, stellate-tomentose, obscurely 2-lipped. *Corolla* 2-lipped, stellate-tomentose without. *Drupe* ·15-·2 in. across, globose.

KHASI HILLS (1-2,000 ft.). KAMRUP.
Timber is said to be good.

Flrs. 5-6. Fr. 7-9.

5. Premna cordifolia *Roxb.*

A shrub, sometimes scandent. *Bark* dark brown. *Leaves* 2·5-6 by 1-2·5 in., ovate, oblong-ovate, oblong-elliptic, entire, acuminate, coriaceous, almost glabrous; lateral nerves 4-6 on either half; base rounded or sub-cordate; petiole slender, ·5-1·5 in. long. *Flowers* greyish in dense terminal corymbiform cymes; pedicels very short. *Calyx* 2-lipped; upper lip 2-lobed; lower entire. *Corolla* ·25 in. long; 2-lipped, densely hairy within; tube twice the length of the calyx; anther-cells shortly divergent. *Ovary* glabrous;

style as long as the corolla tube. *Drupe* ovoid or sub-globose, ·25 in. across, 3-4-seeded. *Seeds* ovoid-acute.

LAKHIMPUR, SIBSAGAR, CACHAR, NAGA HILLS.

Flrs. 11. Fr. Cold season.

6. Premna coriacea *Clarke* (Var. oblonga and cuneata).

A climbing shrub, having epiphytic tendency. *Leaves* 3-7 by 1·2-3 in., orbicular-ovate, elliptic-lanceolate or lanceolate, entire, shortly acuminate, coriaceous, glabrous; lateral nerves 4-7 on either half; veins underneath are elegantly reticulated; base rounded or shallow cordate or cuneate; petiole ·5-1·5 in. long. *Flowers* in large, spreading, terminal, pubescent, paniculate, corymbose cymes; pedicels short; bracts about ·1 in., scattered. *Calyx* truncate, slightly pubescent, obscurely lipped. *Corolla* ·15 in., densely hairy in the throat; lobes 4, greenish-white, subequal; filaments hairy *Ovary* glabrous. *Drupe* ·2 in., narrowly obovoid, 1-seeded, black on ripening.

KHASI HILLS, GOALPARA, SYLHET.

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

7. Premna scandens *Roxb.* Vern. *Laidap-marphu*, Kach.

A large scandent shrub. *Bark* dark greenish-black with large white lenticels both horizontal and vertical. *Leaves* 3-6 by 1·5-2·5 in., elliptic, elliptic-oblong or ovate-oblong, entire, abruptly acuminate, membranous, glabrous; lateral nerves 5-7 on either half, with elegant reticulate venation beneath; base rounded or cuneate; petiole 1-1·5 in. long, channelled. *Flowers* small in large compound, flat-topped corymbiform cymes. *Calyx* greenish, cup-shaped, more or less truncate, glabrous. *Corolla* glabrous, greenish with a large tuft of white hairs closing the mouth of the corolla tube. *Stamens* exserted; filaments and anthers whitish. *Drupe* sub-globose, smooth, tubercled, blackish on ripening.

N. C. HILLS, GOALPARA, KHASI HILLS, SYLHET, CACHAR.

Flrs. 5. Fr. Cold season.

8. Premna khasiana *Clarke.*

A small tree. *Leaves* 4-6 by 2-4 in., ovate or broadly ovate, entire, caudate-acuminate, coriaceous, sparsely pubescent along the nerves; lateral nerves 5-7 on either half; base usually obtuse, sometimes rounded; petiole 1·3-2 in. long. *Flowers* in large pubescent corymb. *Calyx* bilabiate, obscurely 5-toothed. *Corolla* ·12 in. long, glabrous; lobes 4, almost equal, glabrous outside. *Drupe* ·12 in. across, globose.

KHASI HILLS (4,000 ft.).

Flrs. Hot season. Fr. Rainy season.

9. Premna longifolia *Roxb.* Vern. *Gobra-bhodia,* Ass.; *Gambolthaprap,* Garo.

A small tree (28′/20″ usually, but trees seen up to 7 ft. in girth-U. Kanjilal). *Bark* fairly smooth, greenish grey, light dun inside, turning tan brown, mottled with coarse shades of dark brown, ·3-·5 in. thick. *Wood* with unpleasant smell. *Leaves* 8 by 4 in., ovate-acute, entire, coriaceous, glabrous; lateral nerves 5-7 on either half, conspicuous; base rounded; petiole 3-4 in. long. *Inflorescence* corymbiform, terminal. *Calyx* bilabiate, obscurely toothed. *Corolla* greenish-white, ·12-·16 in. long, hairy on the throat. *Drupe* globose, 4-seeded, ·2 in. across (Roxburgh).

GARO HILLS.

Flrs. Hot season. Fr. 7.

10. Premna corymbosa (*Burm. f.*) *Roth et Willd.* Var. obtusifolia (R. Br.) P. integrifolia, P. serratifolia Linn. Vern. *Genderi, Ganioli,* Ass.; *An-kelok,* Mik.; *Pitang-asing,* Miri; *Gejeri,* Nep.; *Parta-pipi,* Duff.; *.Dieng-lah-marwai,* Khasi; *Gunal,* Sylh.

A small tree or large shrub; trunk and larger branches often thorny. *Bark* yellowish green, lenticellate, white inside. *Leaves* 2-4 by 1-2·5 in., oblong-ovate or broadly elliptic or oblong-obovate, entire, undulate, sometimes coarsely dentate towards the apex, sub-obtuse or very shortly acuminate, glabrous on maturity; lateral nerves 4-5 on either

half; base rounded or sub-acute; petiole ·4-·7 in. long. *Flowers* small, greenish yellow in sparsely pubescent terminal paniculate dense corymbose cymes. *Calyx* 2-lipped; one lip 2-toothed; the other sub-entire. *Corolla* subequally 4-lobed; 1 lobe white; 3 green (Haines). *Drupe* ·2 in. across, globose, endocarp obscurely verrucose.

N. E. F TRACT, LAKHIMPUR DARRANG, NOWGONG, KAMRUP, GOALPARA, SYLHET, KHASI HILLS.

The wood is scented, light-creamy brown, even-grained—moderately hard. Leaves are used medicinally.

Flrs. 4-5. Fr. 8-9.

11. Premna pyramidata *Wall.*

A moderate sized deciduous tree; young parts softly and densely stellate-tomentose. *Leaves* 4-8 by 3-5 in., ovate, elliptic-oblong, sub-orbicular, entire or slightly undulate, shortly acuminate, chartaceous, glabrescent above, softly and densely tomentose beneath; lateral nerves 6-9 on either half; base rounded, obtuse or sub-cordate; petiole 1·5-3 in. long, pubescent. *Flowers* yellowish, in stellately tomentose, bracteate, paniculate cymes; bracts linear. *Calyx* 5-toothed, stellate-tomentose. *Corolla* about ·13 in. long. *Drupe* ·16-·2 in. long, ovoid, glabrous.

SIBSAGAR (Kaziranga). U. N. Kanjilal No. 1999

Flrs. Hot season. Fr. End of rainy season.

12. Premna bengalensis *Clarke.* Vern. *Situ-asing Nanji-asing,* Miri; *Lalo-asing,* Abor; *Gohora,* Ass.; *Dholauja,* Cach.; *Pakhir-har, Phongta,* Sylh.; *Jol-chong-i-maiphi,* Kuki; *Nakechal,* Tipp.; *Dhauli,* Mech.; *Bolgoppo,* Garo; *Arhikelok-arong,* Mik.; *Mlung-greng,* Kach.; *Dieng-lih,* Khasi.

A middle sized evergreen tree often grows to a large size (95′/125″); stem irregularly often fantastically fluted. *Bark* greyish white, exfoliating in thin corky papery flakes, inside very light dun, ·1 in. thick; young parts stellately tomentose. *Leaves* 3-10 by 1·5-4 in.; ovate, ovate-oblong or elliptic, entire acuminate, thinly coriaceous, stellate-pubescent along the midrib above, stellately pubescent beneath,

specially when young; lateral nerves 7-12 on either half, sub-parallel, arcuate; base rounded; petiole ·5-1·75 in. long. *Flowers* in large paniculate, stellately pubescent, terminal, corymb form panicled cymes. *Calyx* pubescent, 5-toothed, obscurely 2-lipped. *Corolla* white, greenish white or yellowish, 2-lipped with a row of hairs in the throat, tomentose outside. *Drupe* globose, obscurely verrucose, ·16-·2 in. long.

Common throughout the Province.

Wood yellowish, hard. The timber is used as house posts and is said to be very durable.

Flrs. 5-7. Fr. 8-11.

13. Premna milleflora *Clarke.* Vern. *Dieng-Phonri,* Khasi; *Gambhariskhal,* Garo; *Gobra-bhodia,* Rabha; *Gambarisila, Kach.; Mnn-wong-chal,* Kuki.

A tree upto 7 ft. in girth. *Bark* greenish grey outside; blaze light dun mottled with evenly distributed coarse strands of darker brown, turning deeper brown ·5-·7 in. thick. *Leaves* aromatic, 4-8 by 3-5·5 in., ovate, entire, acuminate, coriaceous, glabrous above, pubescent along the nerves beneath; lateral nerves 8-11 on either half, arcuate; base rhomboid; petiole upto 4 in. long. *Corymbs* very numerously flowered, large, about 12 in. across. *Calyx* obscurely 2-lipped, 4-5-toothed, finely pubescent. *Corolla* throat hairy. *Drupe* ·1 in. across, globose, obscurely tubercled.

N. C. HILLS, GOALPARA, GARO HILLS, MIKIR HILLS, KHASI HILLS.

Wood with unpleasant smell, used as house posts and said to be durable against insect attacks.

Flrs. 6-7. Fr. Cold season.

14. Premna latifolia *Roxb.* Vern. *Phe-phe-arong,* Mik.; *Gainali,* Kamrup; *Dieng-la-marwai, Dieng-soh-phandkhar,* Khasi; *Harmuphang, Gundari-phang,* Kach.; *Dukhemi, Tuthekmi,* Garo; *Gunaru, Gonderi,* Ass.; *Gejeru,* Nep.; *An-kelok-arong,* Mik.; *Arekadoi,* Kuki.

A middle sized tree with spreading crown 30′/60″; young shoots pubescent; young stem spinous. *Bark* grey,

somewhat rough outside; blaze slightly greenish white, soft and crisp (like potato) sweetish; drying black. *Leaves* unpleasant smelling, 2·5-7·5 by 2-4 in., ovate or elliptic, usually entire, undulate, acuminate, thinly coriaceous, glabrescent above, softly pubescent beneath, specially along the nerves; lateral nerves 6-8 on either half; base cuneate, rounded, occasionally shallow cordate and then slightly decurrent; petiole ·5-·9 in. long. *Flowers* greenish, usually in terminal compound corymbose villous cymes. *Calyx* ·08 in., obscurely 2-lipped, 4-5-toothed, accrescent in fruit upto ·2 in. long. *Corolla* about ·13 in. long, 2-lipped, throat villous. *Style* unequally 2-fid. *Drupe* ·16-·2 in. across, globose, black on ripening, hardly verrucose.

Common throughout the Province.
Wood hard. (Bark eaten during famine).

Flrs. 4-6. Fr. Cold season.

Var. mucronata *Clarke*. Syn. P mucronata Roxb. Larger tree, 6 ft. to 8 ft. in girth. *Bark* blackish, ·75 in. thick; blaze white. *Leaves* 2·5-5 by 1·5-3 in., acumen longer; base abruptly cuneate or rounded. *Isflorescence* flat topped. Drupe verrucose.

NOWGONG, SIBSAGAR.
Wood cream-coloured, hard. (Bark eaten during famine).

Flrs. 4-6. Fr. Cold season.

15. Premna micrantha *Schauer.*

Leaves 3·25 by 1·75 in., ovate-acuminate, entire, setulose above, somewhat pubescent beneath. *Flowers* minute in pubescent compound corymbs. *Calyx* ·04-·06 in., minutely 5-toothed.

(F.B.I., P. 578 Vol. IV) (SYLHET—Similar to *P. flavescens* Ham. Brandis P. 511).

No specimen in Forest Herbarium, Shillong.

16. Premna barbata *Wall.* Vern. *Dieng-phonri,* Khasi.

A small tree or shrub (40′/38″). *Bark* grey or pale brown outside, rather rough, softly corky; inside greenish white mottled with brown, turning darker brown. ·1 in. thick; young parts pubescent. *Leaves* aromatic, 1·5-7 by 1·5-3·5 in., oblong or ovate, distantly cuspidate-serrate

towards the apex, acuminate, often caudate, thinly chartaceous, glabrescent when mature; lateral nerves 5-7 on either half; base rounded or sub-cordate; petiole ·5-2 in. long, channelled, sparsely puberulous. *Flowers* greenish white, about ·2 in. across, in terminal corymbose panicles. *Calyx* ·08 in., pubescent, 4 toothed; teeth obtuse, not enlarged in fruit. *Corolla* ·1-·2 in. long, 2-lipped, throat hairy; lobes 4, obtuse. *Drupe* ·15-·2 in. across, glabrous, globose or obovoid, obscurely verrucose, purple when ripe.

NOWGONG, DARRANG, GOALPARA, KHASI HILLS

Flrs. 4. Fr. 6.

17. Premna pinguis *Clarke.* Vern. *Phonri-khyndow,* Khasi.; *Phang-long-le,* Mik.

A small shrub or an undershrub upto 12 ft. high. *Leaves* 4-8 by 2-5 in., ovate-acuminate, occasionally obtuse, serrate, nearly to the base, rather membranous, pubescent specially along the nerves; lateral nerves 4-6 on either half; petiole ·8-3 in. long. *Inflorescence* 1·5-2·3 in. across. *Calyx* campanulate, sub-equally 5-toothed, somewhat accrescent in fruit, almost glabrous. *Corolla* pale white. *Drupe* reddish brown, obovoid, about ·15 in. across.

KHASI HILLS, NOWGONG.

Flrs. 4-5. Fr. 6-7.

18. Premna esculenta *Roxb.*

A short stemmed branching shrub, glabrous. *Leaves* 4-8 by 1-2·9 in., obovate or elliptic or elliptic-lanceolate, acuminate, sharply serrate, membranous, glabrous, paler beneath; lateral nerves 4-7 on either half; base cuneate or acute; petiole ·2-·3 in. long. *Flowers* in dense globose corymb; peduncle short. *Calyx* ·06 in., obscurely toothed, somewhat enlarged and cup-shaped in fruit. *Corolla* 2-lipped, throat hairy. *Drupe* globose, ·12 in. across.

ASSAM (F.B.I. P. 580 Vol. IV, Brandis P. 511).

Flrs. 4-5. Fr. 8-9.

19. Premna macrophylla *Wall.*

An undershrub. *Leaves* 4-9 in., oblanceolate or obovate, remotely crenate or toothed, coriaceous, glabrous; lateral nerves 4-5 on either half; base attenuate; petiole ·1-·2 in. long. *Flowers* in dense shortly peduncled globose pubescent corymbs; bracts hairy, persistent, linear-lanceolate. *Calyx* 2-lipped, striate in fruit. *Drupe* ·16-·2 in. long, rugose, usually 2-seeded (Kurz).

MANIPUR (Brandis 511).

Flrs. 4-6. Fr. 7.

20. Premna herbacea *Roxb.* Vern. *Mati-pharuwa, Bol-sal-thanuri,* Garo; *Matia-jam,* Ass.

A small undershrub from a woody root stock; shoots herbaceous upto 5 or 6 in. high. *Leaves* sessile, 1-5 by ·8 3 in., often in rosettes near the ground or opposite in longer shoots, obovate, coarsely toothed, obtuse, membranous, glabrescent above, puberulous along the nerves beneath; lateral nerves 4-6 on either half. *Flowers* white or greenish yellow, about ·1 in. across, in terminal corymbose panicles. *Calyx* pubescent, cupular, 4-toothed, slightly accrescent in fruit. *Corolla* ·2 in. long, obscurely 2-lipped, 4-lobed, throat hairy. *Drupe* globose, about ·25 in. across, black, glossy.

DARRANG, GARO HILLS, KAMRUP, N. C. HILLS, SIBSAGAR, KHASI HILLS. Found in GOALPARA also. (R. N. De).

Common in grass land.

The roots are considered medicinal. Juice of leaves is rubbed on the body also and applied to the head in fever to reduce temperature. Ripe fruit is eaten (Kamrup).

Flrs. 1-4. Fr. 5-7.

8. VITEX Linn.

Trees or shrubs. *Leaves* opposite, digitately 3-7 foliolate, rarely 1-foliolate, often aromatic or fœtid. *Flowers* in sessile or pedunculate cymes forming terminal and axillary or wholly axillary panicles or corymbs; bracts small, larger or shorter than the calyx. *Calyx* campanulate, truncate or shortly 3-5-toothed, usually enlarged in fruit. *Corolla* 2-lipped; tube short; upper lip of 2 and lower of 3 lobes,

central lobe usually by far the largest. *Stamens* 4, didynamous, usually exserted; anther-cells at first parallel and pendulous, afterwards divaricate. *Ovary* 2-4-celled; ovule solitary in each cell; style filiform; stigma bifid. *Drupe* globose or obovoid, supported by the somewhat enlarged calyx; endocarp bony. *Seeds* obovate or oblong, exalbuminous; cotyledons fleshy.

Inflorescence terminal, occasionally axillary:—
  Petiole without wings:—
    Shrubs or small trees:—
      Leaves 1-3 foliolated, sessile, margin entire. .. .. 1. *V. trifolia.*
      Leaves 3-5 foliolated, petioluled, margins somewhat crenate. .. .. .. 2. *V. Negundo.*
    Trees:—
      Leaves chartaceous (pubescent), usually 3-foliolated (occasionally 4 or 5):—
        Leaflets sessile or nearly so:—
          Bracts large, conspicuous, persistent:—
            Calyx 5-toothed. .. .. 3. *V. pubescens.*
      Leaves generally 5-foliolated:—
        Leaflets petioluled:—
          Bracts very small, deciduous:—
            Calyx obscurely 5-lobed. .. 4. *V. canescens.*
      Leaves membranous, as a rule 5-foliolated, almost glabrous:—
        Calyx truncate:—
          Leaflets petioluled:—
            Bracts very small, caducous. .. 5. *V. quinata.*
  Petioles winged:—
    Trees:—
      Leaves 3 (-5) foliolated:—
        Leaflets sessile or sub-sessile, lanceolate, entire:—
          Branches of inflorescence interrupted cymes, shortly peduncled or clustered. .. .. .. 6. *V. altissima.*
      Leaves 3-foliolated:—
        Leaflets sessile, ovate or elliptic-lanceolate:—
          Branches of thyrsus spiciform. .. 7. *V. limonifolia.*
Inflorescence almost axillary:—
  Leaves 3-foliolated, pubescent or woolly:—
    Cymes sessile:—
      Corolla yellow, glandular. .. 8. *V. vestita.*

Leaves 3-foliolated with shining resinuous glands on the underside:—
Cymes long, peduncled:—
Corolla grey-pubescent. .. .. 9. *V. peduncularis.*
Leaves 5(-3) foliolated, glabrate:—
Cymes pedunculate:—
Corolla white and purple. .. 10. *V. glabrata.*

1. Vitex trifolia *Linn.*

A shrub or a small tree. *Bark* ashy grey, smooth; branchlets obscurely quadrangular, tomentose. *Leaves* 1-3 in., often foliolated. *Leaflets* ·5-2 by ·3-·8 in., (Assam forms) elliptic or obovate, ovate-oblong, entire, obtuse or acute, glabrous above, mattedly greeyish white, tomentose beneath; base rounded or cuneate; lateral leaflets sessile, petiolule or terminal leaflets 0-·1 in. *Panicles* 1-5 in. long; flowers lavender to blue. *Calyx* very shortly 5-toothed, ·08-·17 in. long, greyish, tomentose. *Corolla* ·25-·5 in. long, tomentose. *Filaments* hairy at the base. *Ovary* glandular-dotted. *Drupe* ·2 in. across, ellipsoid, blackish.

LAKHIMPUR.

Flrs. & Fr. 2.

2. Vitex Negundo *Linn.* Vern. *Pasutia, Aggia-chita,* Ass.; *Hing-rain,* Sylh.; *Nishunda,* Beng.

A large strongly scented deciduous shrub or a small tree. *Bark* thin, grey or ashy white; blaze yellow; branchlets striate; shoots, inflorescence and undersurface of leaves grey-pubescent. *Leaves* digitately 3-5-foliolate; petiole 1-2 in. long. *Leaflets* 1·5-5 by ·5-1·5 in., lanceolate or narrow-lanceolate, acuminate or acute, entire, crenulate or coarsely toothed, membranous, glabrescent above; base cuneate or rounded; petiolule 0-·8 in., terminal leaflets having longer petiolule. *Flowers* lavender to blue, ·2 in. across, in opposite cymes, arranged on an elongated panicle up to 12 in. long. *Calyx* about ·1 in. long, campanulate, 5-toothed; teeth triangular. *Corolla* ·4 in. long, pubescent outside, 2-lipped; upper 2-lobed, lower longer, 3-lobed; middle lobe longest, crenulate.

Stamens exserted, ovoid; filaments villous at the base. *Drupe* about ·2 in. across, slightly ribbed, gland-dotted.

Common throughout the Province.
The twigs are used for basket making.
The leaves and roots are regarded as febrifuge and tonic.

Flrs. 4-8. Fr. Cold season.

3. Vitex pubescens *Vahl.* Vern. *Thang-thang-arong,* Mik.; *Ahoi,* Ass.; *Bhadruk, Aoal,* Sylh.; *Miong-greng-phang,* Kach.; *arekodol,* Tipp.; *Dieng-lakhiet-dkhar,* Khasi; *Bhodia, Bandegiri,* Garo.

A large tree (95′/132″) much fluted. *Bark* grey or greyish brown, corky, slightly fissured, ·25 in. thick; inside finely fibrous, yellowish, granular, turning blackish green; branches spreading, quadrangular, lenticellate. *Leaves* usually 3-foliolate (-5); leaflets 2-7 by 1-3 (middle largest) ovate or obovate, oblanceolate, elliptic-lanceolate, acute or acuminate, entire, thinly chartaceous, glabrescent above, minutely pubescent beneath; lateral nerves 10-12 on either half; tertiaries very fine; base rounded or cuneate; petiole 0-·1 in. long. *Flowers* ·5 in. long, ·5 in. across, in densely pubescent terminal panicles. *Calyx* ·15-·25 in. long, campanulate, 5-toothed. *Corolla* 2-lipped, ·4-·5 in. long, pubescent, glandular without, except at base. *Stamens* exserted; filaments villous at the base. *Ovary* glabrous. *Drupe* ·3-·5 in. across, globose, black when ripe and exuding inky juice when cut, depressed at top, enclosed in the enlarged cup-shaped calyx.

SIBSAGAR, NOWGONG, DARRANG, GOALPARA, SYLHET, CACHAR, N. C. HILLS, GARO HILLS, K. & J. HILLS.
Wood yellowish, hard. Timber is used in building works.

Flrs. & Fr. 10-3.

4. Vitex canescens *Kurz.* Vern. *Dieng-sartudkhar,* Khasi; *Than-thang,* Mik.; *Arekdal,* Tipp.; *Panch-pati,* Nep.; *Teta,* Ass.; *Mathokhrai,* Kach.; *Borkeng-thing,* Kuki; *Phung-arong,* Mik.

A deciduous tree (60′/48″) often reaches a girth of 6 ft. *Bark* grey, rough, longitudinally furrowed, about ·5 in. thick; inside light cream but soon turning dirty brown; stem

often buttressed; young shoots pubescent. *Leaves* usually 5-foliolate, often 3-5-foliolate; petiole up to 3 in. long. *Leaflets* 2-8 by ·8-4 in., lateral gradually smaller, ovate or elliptic, entire, acuminate, chartaceous, scabrid, pubescent and yellowish glandular beneath; base cuneate; petiolule ·1-1·3 in. long; the petiolule of the last lateral pairs shortest. *Flowers* dull white in thyrsoid panicles. *Calyx* obscurely toothed, accrescent in fruit. *Corolla* fulvous tomentose outside, conspicuously 2-lipped (middle lobe of lower lip again 3-lobed); lobes with purple veins and dots. *Drupe* ·2-·3 in. across, ovoid, ellipsoid or globose.

N. E. F. TRACT, SIBSAGAR, NOWGONG, KAMRUP, DARRANG, GOALPARA, SYLHET, N. C. HILLS, GARO HILLS, KHASI HILLS (4,000 ft.).

Flowering usually before the appearance of leaves.

Wood cream-coloured, hard Leaves are cattle fodder.

Flrs. 4-6. Fr. 6-10.

5. Vitex quinata (*Lour*) *F. N. Will.*=V. heterophylla Roxb. Vern. *Dieng-sart-udkhar*, Khasi; *Ashoi Jahama-ashoi*, Mech.; *Khungsuman, Khong-sman-bol*, Garo; *Arekadal*, Tipp.; *Bhatkur*, Sylh.; *Tirale-chiang*, Naga.

A large tree. *Bark* grey, corky, reticulately fissured, ·3 in. thick; light dense inside, turning dark greenish brown; branchlets quadrangular, lenticellate. *Leaves* usually 5-foliolate (7-foliolate on coppice shoots); petiole up to 5 in., elliptic or elliptic-oblong, entire, acuminate, membranous, glabrous, gland-dotted; lateral nerves 6-11 on either half; base rounded or cuneate; petiole ·2-1·5 in. *Flowers* faintly scented like violets, dull white with veins and dots of deep purple on lip and throat, fading yellow, in large terminal dense flowered panicled cymes. *Calyx* ·1 in. long, more or less truncate, glandular, pubescent, accrescent and ribbed in fruit. *Corolla* yellow, gland-dotted. *Stamens* exserted; filaments glabrous. *Drupe* about ·2 in. across, globose, sparsely glandular.

N. E. F. TRACT, SYLHET, GOALPARA, N. C. HILLS, GARO HILLS, KHASI HILLS (4,000 ft.).

Wood yellowish.

Flrs. 5-7. Fr. Cold season.

6. Vitex altissima *Linn.* Vern. *Tin-patte*, Nep.; *Anhui, Mon-awal*, Sylh.; *Ashoi* or *Jadh-gach*, Jharua; *Inhet-longhing-arong*, Mik.; *Ahoi*, Ass.; *Selong-phang*, Kach.

A large and tall tree (100 ft. high). *Bark* greyish, one inch thick; cream-coloured inside, turning yellowish brown; young shoots villous. *Leaves* 3-foliolate (rarely more); petiole winged up to 4 in. long. *Leaflets* 2·5-8 by ·8-1·8 in.; lateral leaflets lanceolate; middle one lanceolate or oblanceolate, long acuminate, entire; lateral nerves numerous with finely reticulate venation; base acute or cuneate; petiole 0-·1 in. long. *Flowers* white tinged with blue or violet, in panicles with spiciform interrupted branches of small grey pubescent cymes; *bracts* small, caducous. *Calyx* ·12 in. long; teeth short, triangular. *Corolla* about ·2 in. long, woolly. *Ovary* fulvous-villous. *Drupe* about ·25 in. across, irregularly globose, purplish, often dotted with white specks supported by the accrescent calyx.

SIBSAGAR, DARRANG, NOWGONG, SYLHET, N. C. HILLS, GARO HILLS (upto 4,000 ft.).

Wood yellowish brown, hard and close grained, valuable for building construction, furniture, carts, boats and oil mill pestles, etc.

Flrs. 4-6. Fr. 7-9.

7. Vitex limonifolia *Wall.*

A tree; shoots hairy or woolly. *Leaves* usually 3-foliolate; leaflets 4-7 by 1·5-3 in., ovate, broad-elliptic or broadly lanceolate, acute, entire or sometimes obscurely sessile, subcoriaceous, pubescent specially along the nerves above, pubescent beneath; lateral nerves 9-13 on either half, subparallel, conspicuous; base acute or cuneate, sessile; common petiole winged, 3-4·5 by ·5-·9 in., wings pubescent beneath. *Inflorescence* terminal thyrsoid pubescent panicles; branches spiciform; bracts persistent. *Calyx* ·5 in. long, pubescent; teeth short. *Corolla* ·25 in. long, villous. *Drupe* globose, ·25 in. across, smooth.

KHASI HILLS (Brandis, April 1879).
(No specimen in Forest Herbarium, Shillong).

Flrs. 5-7. Fr. 9-11.

8. Vitex vestita *Wall.*

A shrub or a small tree; young parts pubescent or woolly with long soft hairs. *Leaves* 3-foliolate. *Leaflets* 2-5 by 1-2·6 in., ovate-lanceolate, entire, acuminate, scaberulous above, softly tomentose beneath; lateral nerves 6-7 on either half, slender; base acute, rounded or cuneate; petiolule ·3-·7 in. long, the petiolule of the middle leaflet being always longest; common petiole 1·5-2 in. long (not winged). *Cymes* axillary, shorter than the petioles; *flowers* whitish. *Calyx* ·12 in. long, almost truncate, pubescent. *Corolla* ·3-·5 in. long, covered with yellowish resinous glands; lobes small. *Anther* cells divaricate. *Drupe* ·25 in. across.

ASSAM, KHASI HILLS (Brandis).
(No specimen in Forest Herbarium, Shillong).

Flrs. 4-5. Fr. 8-10.

9. Vitex peduncularis *Wall.* Vern. *Ashoi, Khoidoi, Ahui, Sila, Sila-tita,* Ass.; *Ing-het-lunghin,* Mik.; *Ashoi, Rang-ngi, Rangri, Shilangri,* Garo; *Awal,* Sylh.; *Ashot,* Beng.; *Jadhgach,* Jharua; *Shelong-phang,* Kach.; *Khelreng-thing,* Kuki.

A large tree; young shoots pubescent. *Bark* greyish to darkish grey, 1 in. thick, rough, exfoliating in irregular flakes; cream-coloured or dun yellow and mottled inside, turning dirty greenish brown. *Leaves* 3-foliolate (rarely 4); petiole upto 4 in. long, scarcely winged on maturity. *Leaflets* 2-6 by ·7-2 in., lanceolate or narrow-elliptic, entire, long acuminate, membranous, glabrous, minutely yellowish-gland-dotted beneath; lateral nerves numerous, very slender; base acute or cuneate; petiolule ·1-·5 in. long. *Flowers* pale yellow, ·16 in. long, in axillary panicled cymes 6-11 in. long and exceeding the leaves. *Calyx* very minutely toothed, crimson brown, pubescent with golden or light yellow resinous dots. *Corolla* ·1 in. long, yellow near base and hairy with close-set yellow glands. *Stamens* up curved, arching over the throat of the corolla; anthers limb purple after dehiscence. *Drupe* obovoid, about ·4 in. across.

Occurs throughout the Province.

Petiole is winged in coppice shoots. Wood is very hard and the timber is used for posts, oil-mill pestles and yokes, etc.

Flrs. 4-6. Fr. 7-9.

Var. Roxburghiana. Vern. *Ahay*, Ass. *Bark* irregularly pale greenish yellow inside, quickly turning deeper yellowish; petiole winged even on maturity. *Flowers* white with a rather yellow centre.

KAMRUP, NOWGONG, KHASI HILLS.

Infusion of the leaves of both Vitex peduncularis proper and its Var. Roxburghiana is a valuable specific for Black water fever.

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

10. Vitex glabrata *Br. Prodr.* Vern. *Serlung-baphang*, Kach.; *Pani-amora, Bhodia, Gohera*, Ass.; *Bandi-kari*, Garo; *Langa-thang-thang*, Mik.; *Kaping-asing*, N.-E. F. Tract.

A long deciduous tree (60′/96″). *Bark* ashy grey, corky, smooth, often vertically fissured; pale yellowish inside soon turning greenish black; stem exaggeratedly fluted and buttressed, often gnarled and covered with round excrescences. *Branchlets* obscurely quadrangular. *Leaves* 5 (—3) foliolate; petiole up to 5 in. long. *Leaflets* 2-7 by 1-3 in., obovate, oblong-elliptic or elliptic-oblong, usually entire, acute or acuminate, coriaceous, glabrous and shining above, finely pubescent beneath; lateral nerves 9-14, subparallel, prominent beneath; petiolules ·3-1·5 in. long. *Flowers* ·5 in. long, scented, white with a dash of blue, purple or yellow; in dichotomous lax corymbyform pedunculate cymes. *Calyx* ·12 in. long, campanulate, enlarged in fruit. *Corolla* pubescent with long hairs on the lower part (and longest) lobe near base. *Drupe* oblong-obovoid, succulent, about ·5 by ·6 in.

SIBSAGAR, KAMRUP, GOALPARA, SYLHET, N. C. HILLS, KHASI HILLS (upto 2,500 ft.).

Flrs. 4-5. Fr. 7-8.

9. CLERODENDRON Linn.

Shrubs or trees, sometimes straggling, rarely sub-herbaceous. *Leaves* opposite or whorled in 3's or 4's. *Flowers* 5-merous, zygomorphic, usually showy, in axillary cymes or terminal panicles. *Calyx* campanulate, truncate or 5-toothed, or 5-partite; persistent, often accrescent in fruit and brilliant-

ly coloured. *Corolla* tube slender, often long; limb more or less oblique; lobes spreading. *Stamens* 4, exserted, didynamous; filaments filiform. *Ovary* 4-celled. *Stigma* shortly bifid; ovules solitary in each cell. *Drupe* usually succulent, less often dry, somewhat adpressed, 4-lobed or partite, with 1-4 pyrenes or drupels; albumen 0; cotyledons fleshy.

Inflorescence sub-terminal:—
Corolla tube slender 1 in. long. .. .. 1. *C. Griffithianum.*
Inflorescence terminal, corymbiform or capitate:—
Corolla tube under ·75 in long:—
Leaves entire or serrulate:—
Calyx-segments glandular ·5 in. long. 2. *C. infortunatum.*
Leaves entire:—
Calyx-segments glandular, about ·25 in. long. .. .. 3. *C. villosum.*
Corolla tube 1 in. long:—
Leaves nearly glabrous, shallowly cordate. 4. *C. Colebrookianum.*
Leaves pubescent or tomentose, base cuneate or rounded. .. .. .. 5. *C. lasiocephalum.*
Leaves villous or almost woolly beneath; base cordate to cuneate. .. .. 6. *C. bracteatum.*
Inflorescence terminal, erect, thyrsus; calyx teeth short, almost truncate:—
Leaves sub-sessile; petiole 0-·5 in.; bracts lanceolate, often whorled. .. .. 7. *C. serratum.*
Leaves petiolate; petiole ·5-1·5 in ; bracts ovate, leaflike. .. .. .. 8. *C. venosum.*
Inflorescence terminal, erect, lax thyrsus; calyx divided to near the base:—
Leaves with numerous raised glands, truncate, denticulate (not deeply lobed); petiole covered by a dense ring of hairs. 9. *C. squamatum.*
Inflorescence terminal, lax pendulous thyrsus:—
Leaves glabrous, short petioled (petiole ·2-·6 in. long); base alternate. .. 10. *C. nutans.*
Leaves sparsely pubescent, long petioled (upto 6 in. long); base cordate. .. 11. *C. macrostachyum.*
Inflorescence terminal:—
Corolla tube more than 3 in. long, slender:—
Corolla glabrous:—
Leaves lanceolate, glabrous. .. .. 12. *C. Siphonanthus.*
Corolla pubescent:—
Leaves pubescent or villous, hastate. .. 13. *C. hastatum.*

1. Clerodendron Griffithianum *Clarke.*

A small tree, pubescent. *Bark* greenish white with minute vertical lenticels, ·16 in. thick; blaze greenish, wood white. Leaves 3-8 by 1-2·8 in., oblong, elliptic-lanceolate, caudate-acuminate or acuminate, entire or very obscurely and remotely toothed, membranous, glabrate above, pubescent beneath specially on the nerves; lateral nerves 7-8 on either half; base cuneate or obtuse; petiole pubescent, ·3-·8 in. long. *Flowers* white, in lax corymbiform compound pubescent cymes (terminal or sub-terminal). *Calyx* campanulate, pubescent, about 1 in. long, ·5 in. across; segments triangular-lanceolate, acuminate, about ·6 in. long. *Corolla* white, glabrescent; tube about 1·5 in. long, slender; lobes oblong, ·35 in. long. *Drupe* ovoid, ·5 by ·3 in., enclosed in the enlarged calyx.

LAKHIMPUR, SIBSAGAR.

Flrs. 1-3. Fr. Hot season.

C. fragrans *R. Br.* Vern. *Phlegi,* Mik ; *Dagorphul,* Ass.

A shrub. *Leaves* 2-6·5 by 1·5-4 in., fœtid when bruised, broadly ovate, puberulous. *Flowers* white, fragrant, turning purplish. *Corolla* double or treble.

A native of China. Cultivated in gardens.

2. Clerodendron infortunatum *Gœrtn.* Vern. *Bhettita, Dhopat-tita,* Ass.; *Phlarik-arong, Bikbik,* Mik.; *Syntew-Dohmahi, La-ngiar, Dieng-Jarem-Synrang,* Khasi; *Bhaint,* Sylh.; *Kuthab,* Manip.; *Juthur,* Tipp.; *Sam-makhi, Samsikhs,* Garo; *Bhetu,* Jharua; *Sagainopa,* Kach.; *Reiwang,* Kuki; *Mokhna, Lokhona,* Mech.; *Tokolam,* Naga.

A shrub or an undershrub with fœtid smell, often gregarious, forming dense thickets; sometimes covered with large raised lenticular warts; young parts rusty-villous. *Leaves* 3-9 by 3-7 in., broadly ovate, acuminate, subentire or denticulate, pubescent; lateral nerves 6-9 on either half; base rounded or shallow cordate; petiole ·5-5 in. long, pubescent. *Flowers* white, tinged pink, fragrant, in large lax terminal pyramidal panicles of cymes; panicles often becoming reddish in fruit. *Bracts* elliptic, acuminate. *Calyx* deeply

5-partite, pubescent ·4 in. long in flower, accrescent in fruit, bright red and leathery, ·8-1 in. long; segments acuminate. *Corolla* tube slender, ·7-·9 in. long, pubescent; lobes elliptic or obovate, ·3-·4 in. long. *Stamens* declinate; style much extended. *Drupe* bluish black, at first hidden by the calyx which opens out towards maturity.

Common throughout the Province.

Various parts of the plant are used medicinally. The leaves are tonic and antiperiodic. The fresh juice of the leaves is said to be vermifuge (*I.M.P.*).

Roots are used for fermenting liquor (Garo Hills).

Flrs. 2-5. Fr. 5-7.

3. Clerodendron villosum *Bl.*

A tall shrub up to 10 ft. high, villous. *Leaves* 4-8 by 3-5 in., ovate-acuminate, chartaceous, tomentose above, more so beneath; lateral nerves 3-5 on either half, base cordate; petiole 1·5-2·5 in. long, tomentose. *Panicles* tomentose, terminal. *Calyx* tube short; segments ·3 in. long, tomentose, glandular. *Corolla* whitish, ·3 in. long, hairy outside; lobes oblong, glabrescent. *Stamens* exserted. *Drupe* ·3 in., black.

NAGA HILLS (4,500 ft.) Brandis P. 507.
(No specimen in Forest Herbarium, Shillong).

Flrs. 11-1. Fr. 3.

4. Clerodendron Colebrookianum *Walp.* Vern. *Dieng-Ja-Kangum, Dieng-Ja-Rem-Kynthei,* Khasi; *Bon-bhati,* Sylh.; *Anpui,* Lushai; *Lukhna-buphang,* Mech.

A shrub about 15 ft. high with a globose crown and disagreeable smell. *Bark* shining light grey. *Leaves* 3·5-10 by 2·5-8·5 in., broad-ovate, acute, entire, membranous, almost glabrous; lateral nerves 6-9 on either half; base shallow cordate; petiole ·5-6·5 in. long, with cluster of glands near the apex. *Flowers* white in broad terminal compact, corymbiform compound cymes; bract caducous. *Calyx* pubescent, often bearing a few glands; calyx-teeth short. *Corolla* tube slender, 1-1·25 in. long; style exserted. *Fruit* bluish green to deep green when fully ripe, glossy, ·3 in. across, globose,

compressed above, of 4 drupels seated on an accrescent cup-shaped calyx about ·4 in. across.

SIBSAGAR, NOWGONG, SYLHET, CACHAR, N. C. HILLS, K. & J. HILLS.

Flrs. & Fr. Cold season.

5. Clerodendron lasiocephalum *Clarke.* Vern. *Syntew-domahi,* Khasi.

A shrub 10 ft. high; branchlets pubescent. *Leaves* 3-7 by 2·5-5 in., ovate or elliptic-oblong, dentate, acuminate, membranous, pubescent; lateral nerves 5-7 on either half; base cuneate or rounded; petiole 1-4 in. long. *Flowers* in almost capitate compact cymes. *Calyx* pubescent, ·7 in. long, divided nearly to the base; segments-lanceolate, fairly cordate, acuminate. *Corolla* tube slender, upto 1·4 in. long; lobes 5, oblong or obovate, ·35 in. long. *Drupe* ·3 in. across, red.

KHASI HILLS, MISHMI HILLS.

Flrs. 4-7. Fr. End of rainy season.

6. Clerodendron bracteatum *Wall.* Vern. *Dom-Bhetai,* Ass.; *Mishimiaoguphu,* Kach.; *Anphui-rathol,* Kuki; *Bikbi-kelok,* Mik.; *Dieng-kylasla, Dieng-iarem, Dieng-rasma,* Synt.

A shrub (25′/15″); young shoots villous. *Bark* ash-coloured, rough, thin; blaze greenish, cream-coloured. *Leaves* 3-8 by 1·5-5 in., ovate, acuminate, entire, membranous, fairly scaberulous above, tomentose beneath; lateral nerves 5-7, oblique, arcuate, lowest pair basal; base truncate or shallow cordate; petiole ·5-4 in. long. *Flowers* white, scented, in pedunculate bracteate capitate cymes forming a tomentose corymbiform leafy panicles; bracts ovate or oblong, apiculate, tomentose. *Calyx* membranous, deeply divided; segments ovate-lanceolate. *Corolla* tube slender, pubescent, upto 2 in. long; lobes ·5-·6 in., elliptic; anthers purple, turning brown. *Drupe* globose, ·3 in. across, bluish purple, seated on an enlarged reddish subcoriaceous calyx.

LAKHIMPUR, SIBSAGAR, DARRANG, CACHAR, N. C. HILLS, K. & J. HILLS (upto 5,500 ft.).

Flrs. 9-11. Fr. 1-3.

7. Clerodendron serratum *Spreng.* Vern. *Beja-otiasing, Pumi-aye,* Miri; *Nangal-bhanga,* Ass.; *Teuri-longphlang,* Kach.; *Sam-seng, Machhok-nachil, Samgongol,* Garo; *Hursymet, Rilong-phlang,* Khasi; *Phalang-helhoh,* Mik.; *Dieng-la-myrsiang,* Synt.

A shrub or an undershrub with woody root-stock upto (5′/15″); young branchlets quadrangular. *Bark* greyish, rough, ·25 in. thick; blaze brownish. *Leaves* with a fœtid smell, 2-11 by ·8-4·5 in., oblong, oblong-ovate or elliptic-oblong, coarsely serrate, acuminate, coriaceous, often fleshy, glabrescent when mature; lateral nerves 6-8 on either half, arcuate; base narrowed; petiole 0-·5 in. long. *Flowers* light red, cymose on the lateral and opposite branches of a terminal elongate pubescent panicle lowest from the axiles of reduced leaves; bracts persistent, pubescent, ovate to lanceolate, ·5-1·5 in, long. *Calyx* ·3 in. long, pubescent, cupular; teeth very shallow, somewhat accrescent in fruit. *Corolla* tube short, ·3 in. long, hairy within; lobes 4, lateral, subequal, ovate-oblong, old lobe longer than the others, darker in colour and concave. *Drupe* black when ripe, ·3 in. across, of 1-3 succulent connate drupels.

Common throughout the Province.

The root is used in febrile and catarrhal affections. The leaves are also used as medicine. Young shoots, leaves and flowers are eaten cooked as a vegetable.

Flrs. & Frs. 10-5 (practically all the year round).

8. Clerodendron venosum *Wall.*

A tree (40′/36″). *Bark* pale grey, thin: branches tubercled. *Leaves* 4-7 by 1·5-2·5 in., elliptic-obovate or elliptic, acuminate, entire or distantly serrate, membranous, glabrous above, glabrescent beneath (dull brown on drying); lateral nerves 6-7 on either half; base narrowed into the petiole or acute; petiole ·5-1·5 in. long. *Flowers* bluish in erect elongated bracteate pubescent thyrsoid panicles; bracts leafy, ovate, acuminate. *Calyx* ·5 in., almost truncate; teeth obscure. *Corolla* bluish with greenish-white tinge.

Drupe succulent, purplish black, seated on a cup-shaped somewhat enlarged calyx.

GOALPARA, KHASI HILLS (upto 4.000 ft.).

Flrs. Hot season. Fr. 8-10.

9. Clerodendron squamatum *Vahl.* Vern. *Dhopattita,* Sibsagar; *Bhandariphul,* Sylh.

A shrub, upto 6 ft. high. *Leaves* 5-10 by 4-9 in., broad ovate or sub-orbicular, acuminate, denticulate, membranous, sparsely scaberulous above, glabrous and gland-dotted beneath; lateral nerves 6-9; base cordate or shallow cordate; petiole ·5-10 in. long. *Flowers* in large terminal erect, pyramidal thyrsoid panicles of which every part is scarlet. *Calyx* divided nearly to the base; segments accrescent in fruit, coriaceous, ·3-·6 in. long, scarlet pubescent and glandular towards the apex. *Corolla* tube about 1 in. long, slender; lobes ·3-·5 in., scarlet. *Drupe* bluish black, ·3-·5 in. across.

SIBSAGAR, NAGA HILLS, SYLHET; also widely cultivated in the gardens.

Flrs. 6-10. Fr. Cold season.

10. Clerodendron nutans *Wall.* Vern. *Dieng-julkoh, Mei-soh-randi, Hor-randieng, Jathang-kaske,* Khasi; *Bonthesa-buphang, Mis-mau-jalla-phang,* Kach.; *Uthero,* Manip.; *Baphul-kung,* Tipp.; *Balungre,* Garo; *Tarlong-arong, Thainkrokoli-arong,* Mik.; *Dieng-syntew-la-hariam,* Synt.

A shrub about 12 ft. high, glabrous. *Bark* reddish brown. *Leaves* 2-9 by ·5-2 in., lanceolate, oblanceolate or elliptic-lanceolate, long, acuminate, entire or sometimes remotely and slightly toothed, membranous, glabrous; lateral nerves 6-7 on either half, slender; base narrowed into a short petiole ·2-·7 in. long. *Flowers* white, in lax pendulous thyrsoid panicled cymes; bracts minute; pedicels slender. *Calyx* deeply divided, greenish; segments valvate, triangular, lanceolate, enlarged in fruit, brick-red; stellately spreading, about ·5 in. long. *Corolla* tube white, ·5 by ·08 in.; lobes spoon-shaped. *Filaments* slender, 1·5 in. long. *Style* rather

shorter than the stamens; stigma minute. *Drupe* succulent, deep purple, ·4-·5 in. across, of 1-4 drupels.

SIBSAGAR, NOWGONG, DARRANG, SYLHET, N. C. HILLS, GARO HILLS, GOALPARA, K. & J. HILLS (upto 4,000 ft.).

Flrs. 9-12. Fr. 12-4.

11. Clerodendron macrostachyum *Turcz.*

A rather herbaceous plant, 5-6 ft. high, growing on lime stone. *Leaves* 4-6 by 3-4 in., ovate, dentate, almost lobed, acute, membranous, cordate; petiole upto 6 in. long. *Flowers* pale blue or purple in terminal panicles upto about 11 in. long; pedicels filiform. *Calyx* minute, small. *Corolla* glabrous; lobes ·2 in. long, obovate. *Stamens* far exserted. *Style* sub-terminal. *Drupe* ·1 in. long, obovoid, covered with red glands ultimately splitting into 4 pyrenes.

KHASI HILLS 2,000 ft. (Wallich).
(No specimen in the Forest Herbarium, Shillong; imperfectly known).

12. Clerodendron Siphonanthus *Br.* Vern. *Akalbih,* Ass.; *Hanmathucho, Tarlong-pi-thepo,* Mik.; *Chokphutra,* Sylh.; *Ikhlabir,* Mech.; *Hemla,* Nowgong.

An erect shrub with fluted hollow stem. *Bark* ashy-grey, smooth; blaze greenish. *Leaves* in whorls of 3-6, 3-8·5 by ·5-1·5 in., narrow-lanceolate or oblong-lanceolate or linear, entire or serrate, acuminate, chartaceous, glabrous; lateral nerves 6-10 on either half, oblique, usually meeting in a continuous line somewhat inside the margin; base tapering: petiole 0-·2 in. long. *Flowers* handsome, white or cream, 3-5 in. long, drooping on opposite or whorled few flowered cymes forming a large rigid panicle; bracts linear or linear-lanceolate, ·5 in. long. *Calyx* deeply partite, green, 4 in. across in flower and ·8-1·2 in., in fruit, red; segments oblong or ovate, acuminate. *Corolla* tube very slender, lobes acuminate, ·5-·7 in. long, obovate or oblong. *Drupe* bluish or 4 connate drupels, seated on the enlarged calyx.

Common throughout the Province.
The juice expressed from the herbaceous portion is used with

ghee for various skin diseases. Smoke of dried leaves is said to cure cough.

Leaves are eaten by the Mikirs as vegetables.

Flrs. 10-5. Fr. 12-8.

13. Clerodendron hastatum *Lindl.* Vern. *Dieng-kym-bata-ngiang-mong,* Khasi.

A large shrub; young parts pubescent. *Leaves* 2·7·5 by 1·3-6 in., opposite, often in very unequal pairs, hastate, ovate or oblong, lobed or angled, acute or acuminate, membranous, scaberulous above, softly beneath, specially along the nerves, often purplish beneath; base shallow cordate or hastate; lateral nerves 4-6 on either half, 2 lower from the base; petiole 1-5·5 in long. *Flowers* in dense broad corymbiform terminal panicles; bracts linear, about ·6 in long. *Calyx* about 1 in. long, dull greenish white, divided nearly to the base; segments up to ·6 in. long, ovate-oblong, acute. *Corolla* tube 4-6 in. long, ·1 in across, hairy outside, inflated from points of insertion of filaments; lobes 1·1·25 by ·2-·25 in. *Filaments* purple on the exposed half, white in the portion inside the corolla tube. *Drupe* purplish black, succulent, ·3-5 in. across, seated on the much accrescent red calyx.

SYLHET, GOALPARA, SIBSAGAR and KHASI HILLS.

Flrs. 5-6. Fr. Cold season.

10. HOLMSKIOLDIA Retz.

Holmskioldia sanguinea *Retz.* Vern. *Dieng-skor-khnai, Jermei-snam-khmut, Syntew-nong-smud, Mei-da-kyna,* Khasi; *Manu-kata-phul,* Ass.; *Hurmili, Arnamamir, Wo-so, long-i-arong,* Mik.; *Misi-nasil,* Garo; *Khemjuta-phang,* Kach.

A large straggling shrub. *Bark* dark brown or grey, smooth, peeling off in narrow papery strips; branchlets angular pubescent, drooping. *Leaves* 2·1-6 by 1·5-3·5 in., ovate-acuminate, crenate or crenate-serrate, membranous, pubescent; lateral nerves 4-6 on either half; base truncate, subcordate or often abruptly cuneate; petiole ·5-1·2 in. long. *Flowers* red, showy (one shrub noticed by Rai Bahadur U. N. Kanjilal with pale green calyx and corolla) in

short axillary and terminal pubescent cymes; bracts small. *Calyx* salver-shaped, scarlet or orange-red, membranous, entire or with an undulate margin ·7-1 in. across, persistent and somewhat accrescent in fruit. *Corolla* ·6-1 in. long, tube curved, ·8 in. long; limb oblique, unequally 5-lobed. *Stamens* didynamous, exserted; anther cells parallel. *Ovary* of two 2-celled carpels with one ovule in each cell; style terminal: stigma shortly bifid. *Fruit* drupaceous, included with the calyx, obovoid, deeply 4-lobed at the apex, nearly dry, separating into 4-1 pyrenes.

Common throughout the Province.

Flrs. 10-12. Fr. End of cold season and hot season.

Recently I have discovered a yellow flowering variety of this species—R. N. De.

11. CARYOPTERIS Bunge.

Caryopteris paniculata *Clarke.*

A spreading shrub; branches slender, terete, pubescent. *Leaves* 2·7-6 by 1-2·1 in., elliptic-acuminate, toothed, coriaceous, punctate with yellow glands, glabrate when mature; base obtuse or rounded; petiole ·2-·3 in. *Flowers* violet or lilac (Brandis) in small subsessile dense-flowered thyrsoid panicle. *Calyx* deeply 5-fid, scarcely accrescent in fruit; segments 5-7 in. long, acuminate. *Corolla* pubescent; tube short, cylindric, about ·16 in. long; lobes 5, imbricate in bud, 4 equal, the 5th lower, longer. *Stamens* exserted; anther-cells divergent at base. *Ovary* imperfectly 4-celled, 4-ovuled; style filiform, shortly 2-fid. *Capsule* dividing into 4 valves with incurved margins holding the 4 one-seeded slightly winged pyrenes.

N. E. F. TRACT, MANIPUR, LUSHAI HILLS, MISHMI HILLS.

Flrs. & Fr. 12-4.

C. Wallichiana *Schau.*

A large spreading shrub; bark brownish, peeling off in narrow papery strips; branchlets quadrangular, pubescent. *Leaves* 2-5 by 1-1·5 in., lanceolate, narrow-elliptic, crenate-serrate or sub-entire, accunate, puberulous; lateral nerves 4-5 on either half; base cuneate; petiole ·3-·5 in. long, formed by an interpetiolar line. *Flowers* slightly fragrant, light-mauve or light-blue, ·5 in. across in cymes forming terminal thyrsoid panicle; lower cymes axillary; bracts minute. *Calyx* ·15 in.

long, 5-fid; segments linear-lanceolate, somewhat ribbed, erect and slightly enlarged in fruit. *Corolla* 2-lipped; tube ·2-·3 long, shorter than the lobes; middle lobe of lower lips deeper coloured (bluish), others pale whitish and shorter. *Stamens* didynamous, exserted; anthers confluent. *Ovary* 4-celled with one pendulous ovule in each cell; style exserted *Fruit* ·2 in long, capsular, globose, pubescent, separating into concave valves with one seed in each.

Flrs. 2-4. Fr. 5-7.

12. SPHENODESMA Jack.

Scandent large shrubs. *Leaves* opposite, entire. *Flowers* sessile in pedunculate capitate 3-7-flowered cymes enclosed in an involucre of 6 foliaceous accrescent bracts, arranged in panicles. *Calyx* ovoid, campanulate, 5-toothed (rarely 4 or 6.) *Corolla* more or less zygomorphic; tube short, cylindric; lobes 5, rarely 6, subequal, imbricate in bud. *Stamens* 5, as a rule included; anthers oblong or reniform, parallel or divergent. *Ovary* 2-celled; ovules 2 in each cell, pendulous from the apex of the axile placenta; style short or long; stigma 2-lobed. *Drupe* obovoid or globose, included in the calyx, 1-(rarely 2) seeded; cotyledons fleshy; radicle inferior.

Style obsolete; hairs stellate:—
  Anthers undivided:—
    Involucre bracts-obtuse, lanceolate or oblanceolate. Ovary glabrous. .. *1. S. unguiculata.*
Style filiform, long; hairs not stellate:—
  Anthers exserted:—
    Involucre bracts linear-oblong. Ovary densely villous. .. .. .. *2. S. pentandra.*

1. Sphenodesma unguiculata *Schaucer.*

A large deciduous climber with twisted stem; young parts and inflorescence stellate-pubescent or tomentose. *Leaves* 3-7 by 1·5-3 in., ovate-elliptic or oblong-elliptic, acuminate or acute, entire, coriaceous, glabrous when mature, sparsely stellate, hairy when young; lateral nerves 4-7 on either half, impressed above, more conspicuous beneath; base rounded or subacute; petiole ·3-·6 in. long. *Flowers* cream-coloured, sessile in involucrate heads usually arranged in terminal panicles; bracts 6, much enlarged in fruit, spathulate, elliptic or oblanceolate, membranous, prominently

veined (1·5 by ·6 in.). *Calyx* stellate-tomentose, obconic; teeth usually 5. *Corolla* lobes (5-6), obovate or oblong. ·12-·16 in. long. *Stamens* 5, included. *Ovary* glabrous, imperfectly 2-celled; ovules 4, pendulous; stigma sessile, bifid. *Drupe* ovoid, glabrous, glandular at the apex.

N.-E. F. TRACT, KHASI HILLS, NAGA HILLS, CACHAR.
Flrs. 12-1. Fr. 2-3.

2. Sphenodesma pentandra *Jack.* Vern. *Tukha-karaing,* Kach.; *Baking-rap-rikang, Arkeng-ke-et,* Mik.

A large woody climber; branchlets obscurely 4-angled, lenticellate, rusty pubescent. *Leaves* 2-6 by 1-1·5 in., elliptic-oblong, ovate, ovate-lanceolate, acuminate or acute, occasionally mucronate, sub-coriaceous, glossy green above, paler beneath and pubescent when young, both surfaces glabrous when mature; lateral nerves 4-7 on either half, arcuate, oblique; base rounded; petiole ·2-·4 in. long, channelled, pubescent. *Flowers* ·5 in. across, delightfully fragrant in axillary or terminal panicles, somewhat pubescent, the involucrate heads are in opposite pairs or often subtended by a leaf-like bract; bracts linear, oblong, almost glabrous, enlarged to about 1 in. in fruit. *Calyx* funnel-shaped, almost glabrous, 5-toothed, 10-ribbed, mouth inflated in fruit with 5 accessory teeth. *Corolla* purplish, glabrate without, densely villous within. *Anthers* exserted. *Ovary* densely villous: style very long, slender. *Drupe* size of a pea, 1-seeded.

N. E. F. TRACT, NOWGONG, SIBSAGAR, CACHAR, GARO HILLS, MANIPUR, NAGA HILLS, SYLHET, KHASI HILLS.
Flrs. 12. Fr. 4.

Phryma leptostachya *Linn.*

A small erect herb. *Leaves* 1·5-3 by ·5-1·2 in., ovate or ovate-lanceolate, acuminate, dentate-crenate, membranous, whitish grey and thinly pubescent on the nerves beneath; base cuneate; petiole ·5-1 in. long. *Flowers* pale pink in alternate long slender racemes. *Calyx* tubular; teeth 3-linear, hooked; *Corolla* bilabiate; lower lip or 3 rounded patent lobes. *Stamens* 4-didynamous. *Ovary* oblong-oblique. *Urticle* membranous, oblong, 3 in. long.
KHASI HILLS, (4,000-6,000 feet).
Flrs. and Fr. 8-9.

FAM. 101. LABIATÆ.

(J. D. Hooker.)

Herbs or undershrubs, rarely shrub, often aromatic due to essential oils secreted in various forms of glandular hairs, stems usually quadrangular. *Leaves* simple, opposite or whorled, exstipulate. *Flowers* more or less zygomorphic, hermaphrodite, solitary or in pairs or fascicled and axillary or in centrifugal cymes forming false whorls; bracts and bracteoles usually small. *Calyx* inferior, persistent, more or less tubular, 4-5-fid, often distinctly 2-lipped. *Corolla* hypogynous with tubular base, 4-5-lobed or bilabiate; lobes imbricate in bud. *Stamens* inserted on the corolla 4, usually didynamous or only 2, perfect; anther-cells connate, separate or confluent, dehiscing longitudinally. *Disc* prominent. *Ovary* superior, 4-lobed or partite; style slender, simple, from the centre of the ovary between the lobes; stigma usually bifid, sometimes subequally; style mostly gynobasic, arising from the inner base of the lobes; ovules anatropous. *Fruit* of 4 usually dry, 1-seeded nutlets, sometimes 1 or more suppressed. *Seeds* erect; albumen scanty or 0: radicle inferior.

Ovary 4-partite Nutlets with basal or dorso-basal areole :—

A. Nutlets dry :—
Stamens 4, declinate; anther-cells confluent:—
Lower lip of corolla declinate, flat or nearly so :—
Fruiting calyx deflexed, upper teeth large, ovate, recurved, decurrent :—
Corolla tube short, lower lip flat, stigma 2-fid. .. .. .. **1. Ocimum.**
Corolla tube usually long, lower lip concave, stigma entire. .. .. **2. Orthosiphon.**
Fruiting calyx declinate, 2-lipped, upper filaments toothed .. .. .. **3. Mesona.**
Fruiting calyx suberect not transversely pitted or ribbed :—
Flowers in capitate globose or ovoid whorls. .. .. .. **4. Acrocephalus.**

Fruiting calyx suberect or declinate, transversely pitted or ribbed :—

Flowers in simple raceme. .. **5. Geniosporum.**

Lower lip of corolla concave, boat-shaped or saccate, much longer than the upper lip :—

Filaments free :—

Calyx oblique, 2-lipped, upper lip usually deflexed on the mouth in fruit :—

Flowers in spikes. .. .. **6. Anisochilus.**

Calyx equally 5-toothed or obscurely bilabiate :—

Flowers in whorls or lax cymes. .. **7. Plectranthus.**

Filaments connate. .. .. **8. Coleus.**

Stamens not declinate; anthers 1- 2- celled:—

1. Stamens suberect, dumping and distant :—

Stamens 4, perfect :—

Corolla lobes flat; anther 1-celled :—

Calyx 5-toothed :—

Corolla sub-bilabiate. .. **9. Pogostemon.**

Corolla sub-equally 4-lobed. .. **10. Dysophylla.**

Stamens 4, perfect; anthers 2-celled :—

Filaments not bended:—

Fruiting calyx erect, elongate. .. **11. Elsholtzia.**

Fruiting calyx declinate, bilabiate. **12. Perilla.**

Fruiting calyx 10-nerved, 5-toothed. **13. Mentha.**

Stamens perfect 2, anthers 2-celled. .. **14. Mosla.**

Corolla bilabiate. Calyx 13-nerved :—

Calyx 2-lipped. Corolla tube nearly straight :—

Stamens 4 or 2, upper imperfect. **15. Calamintha.**

Calyx 2-lipped. Corolla tube curved :—

Stamens 4, perfect. .. .. **16. Melissa.**

Stamens 2. perfect :—

Corolla 4-lobed, anther-cells 2, equal, pendulous from a long connective. .. **17. Meriandra.**

Corolla 2-lipped; anther very unequal or solitary on a long connective. .. **18. Salvia.**

Stamens 4, perfect, lower pair longest :—

Upper lip of corolla hooded, not woolly:—

Calyx 2-lipped, mouth elongated after flowering; upper lip of calyx with a broad plate. .. .. **19. Scutellaria.**

Calyx tubular, upper lip 3- or 2-toothed. .. .. .. **20. Brunella.**

Upper lip of corolla short .—
Calyx tubular or campanulate :—
Anther-cells divaricate, nutlets subglobose. .. .. **21. Craniotome.**
Anther-cells of lower stamens parallel, transverse or upper dentate. .. .. .. **22. Anisomeles.**
Anther-cells confluent; nutlets winged .. .. .. **23. Colquhounia.**
Upper lip of corolla hooded, villous :—
Calyx 5-toothed, spinescent :—
Stamens more or less exserted; anther-cells parallel. .. .. **24. Leonurus.**
Calyx 8- or 10- toothed :—
Stamens included; anther-cells divergent :—
Lower lip of corolla longer than the hood. .. .. **25. Leucas.**
B. Nutlets succulent. Corolla bilabiate, the upper lip hooded, anther-cells parallel, the interior pair of stamens longer :—
Calyx 5-toothed. Corolla tube slender, throat broad. .. .. **26. Gomphostemma.**
2. Stamens ascending :—
Stamens 4, perfect :—
Ovary 4-lobed, with a large oblique or ventral anthers :—
Upper corolla tip very short. Stamens very long, stringent, divergent. .. .. .. **27. Leucosceptrum.**
Upper corolla very short, 2-fid with the incurved stamens exserted from the cleft. .. **28. Teucrium.**

1. OCIMUM Linn.

Strongly aromatic herbs, undershrubs or shrubs. *Leaves* opposite or whorled, pitted with numerous minute glands. *Flowers* small, purplish or white in 6-10-flowered whorls in terminal spikes or racemes, sometimes panicled; pedicel-tips recurved; bracts small, caducous. *Calyx* ovoid or campanulate, deflexed in fruit, 2-lipped; upper lip broad, flat, decurrent; lower lip with 4 mucronate teeth, the 2 middle ones usually the largest. *Corolla* bilabiate; tube short not annulate within, upper lip sub-equally 4-fid, lower lip entire, declinate, hardly longer than the upper. *Stamens* 4, didyna-

mous, declinate, exserted; filaments free or the lower pair connate below, naked, the upper often toothed or hairy below; anther-cells confluent. *Disc* entire or 3-4-lobed. *Ovary* 4-partite; style gynobasic; lobes subulate or flattened; stigma bifid. *Fruit* of 4 dry nutlets, smooth or sub-rugose, more or less mucilaginous when moistened.

Two lower calyx teeth longer than the upper lip :—		
Pedicels as long or longer than the calyx. Nutlets not mucilaginous when wetted :—		
Fruiting calyx glabrous within. ..	1.	*O. sanctum.*
Pedicels shorter than the calyx. Nutlets mucilaginous when moistened :—		
Corolla ·15-·2 in. long:—		
Fruiting calyx villous within. ..	2	*O. canum.*
Corolla ·3-·5 in. long:—		
Fruiting calyx large, hairy or glabrous	3.	*O. Basilicum.*

1. Ocimum sanctum *Linn.* The sacred Basil. Vern. *Tulsi.*

A perennial with woody root-stock; branchlets purplish, softly hirsute or pubescent. *Leaves* 1-2 by ·5-1 in., ovate or ovate-oblong or elliptic-oblong, distantly serrate, crenate or entire, acute, membranous, pubescent; base acute; petiole ·1-·3 in. *Flowers* 1·8-2 in. long, purplish or crimson in racemed, often panicled whorls upto 8 in. long; pedicels usually longer than the calyx; bracts reflexed. *Calyx* glabrous within, glandular and pubescent without, enlarged in fruit; upper lip obovate and acute at the base in fruit, shorter than the lower lip. *Corolla* ·15 in. long, upper lip hairy on the back: filaments of the upper stamens bearded at the base. *Nutlets* reddish with black markings ·05 in. long, ellipsoid.

Cultivated throughout the Province It is the sacred plant of the Hindus. The leaves are medicinally efficacious and are much used for catarrh and other pulmonary affections The stems are made into rosaries and worn largely by *Vaishnavas.*

The plant is reputed to keep off mosquitoes. (*I.M.P.*).

Flrs. and Fr. Rainy season to cold season.

2. Ocimum canum *Sims.* The hoary Basil.

An erect very pubescent undershrub. *Leaves* ·5-1·5 in., elliptic or elliptic-lanceolate, glandular, glabrate on maturity.

Flowers white or pale purple. *Calyx* densely villous inside, upper lip in fruit sub-orbicular, shorter than the teeth of the lower lip. *Nutlets* ·05 in. long, black when ripe.

SYLHET. Cultivated

The seeds become very mucilaginous in water. The leaves are made into a paste and are applied to finger and toes for resting warmth, when the extremities become cold during fever. (*I.M.P.*).

Flrs & Fr. 8-3.

3. Ocimum Basilicum *Linn.* Var. purpurascens. The Sweet Basil. Vern *Tew-la-pong-nai*, Khasi.

A slender much scented and much branched herb, generally purple coloured; stems glabrous or more or less pubescent, hairy at the nodes. *Leaves* ·5-1·5 by ·2- 5 in., ovate, acute, entire or more or less lobed or toothed, glandular; petiole ·5 in. long. *Flowers* pale purple in nearly single racemes; pedicels shorter than the calyx, much deflexed in fruit, upper lip of calyx rounded, shorter than the teeth of the lower lip. *Nutlets* ·07 in. across, ellipsoid, black, slightly pitted and become very gelatinous in water.

KHASI HILLS. Cultivated

The leafy tops which have a fragrant taste are often used as a seasoning for culinary purposes The leaves are used in the treatment of bronchitis. The expressed juice is said to cure ring-worm, and an application of bruised leaves relieves pain from scorpion stings. They are used in catarrh, chronic diarrhœa, dysentery, nephritis and in several other ailments

Flrs & Fr. 9-3

2. ORTHOSIPHON Benth.

Aromatic shrubs, undershrubs or herbs with woody root-stock or tuberous roots. *Flowers* in whorls of 6 or fewer flowered in terminal raceme. *Calyx* ovoid, campanulate, deflexed in fruit; the upper lip broad, membranous with decurrent margins. *Corolla* bilabiate, sometimes very long; upper lip sub-equally 4-lobed; lower entire, concave, declinate. *Stamens* 4, didynamous, declinate, glabrous; filaments free without appendages at the base; anther-cells confluent. *Disk*

usually gibbous; stigma capitate or clavate. *Fruit* of 4 nutlets, ovoid, globose or ellipsoid, usually smooth.

Stamens included :—
  Calyx throat not villous within :—
    Petiole upto 1·5 in. long. .. .. 1. *O. incurvus.*
    Petiole upto ·75 in long. . .. 2 *O. robustus.*
Stamens far exserted : -
  Calyx throat not villous within. Filaments conspicuously long, filiform. .. .. 3 *O. aristatus.*

1. Orthosiphon incurvus *Benth.*

An erect rarely branched herb with tuberous roots. *Leaves* ·15-4 by ·7-2·3 in., ovate or ovate-lanceolate, coarsely crenate, acute, or acuminate. *Fruiting* calyx ·3-·5 in. long, lower lip curved. *Corolla* purplish.

KHASI HILLS (4,000 ft.).
Flrs. 6-8 Fr. Cold season.

2. Orthosiphon robustus *Hook. f.*

A robust finely pubescent herb. The whole plant when dried becomes dark rusty colour clothed uniformly with fine pubescence (*F. B. I.*).

DUFFLA HILLS.
Flrs. 2. Fr. Hot season.

3. Orthosiphon aristatus *(Bl)* Miq.=O. stamineus Benth.

An erect pretty herb about 4 ft.: stem quadrangular. *Leaves* 2-9 in. long, ovate-acuminate, coarsely toothed. *Flowers* lilac or light purplish blue. *Fruiting* calyx campanulate. *Corolla* ·5-·75 in. long, puberulous: upper lip 4-lobed. *Stamens* filiform, very long, much longer than the corolla lobes; filaments long. *Nutlets* ellipsoid, compressed, rugose.

MANIPUR, NAGA HILLS.
In Java, the leaves are made into tea and used in the treatment of diseases of the kindneys and bladder. In Holland and France, they have been used successfully in the treatment of diseases of urinary organs (*I.M.P.*).

Flrs. 8-10. Fr. Cold season.

Orthosiphon glandulosus C. E. C Fischer. Kew Bulletin 1930. P. 240.

An undershrub, stems obtusely quadrangular, sulcate when dry *Leaves* 4·5-9 by 3-6 in, broadly ovate, cauline acuminate with scattered stiff whitish multi-cellular hairs above, dotted with yellowish glands on both faces, pale beneath, primary nerves 5-7 pairs, ascending, arched; margins broadly apiculate, dentate, base shortly cuneate or the smaller ones sub-cordate; petioles ·15-·4 in, glabrous *Scape* upto 12 in., rachis obtusely quadrangular, 4-sulcate more or less densely furfuraceous brown, hairy, bracts ovate-cordate, nearly glabrous, ·3 in long *Flowers* white in whorls of 4 or 6, pedicels brown furfuraceous, ·17-·2 in long *Calyx* narrowly campanulate, membranous, ·3-·4 in long, furfuraceous hairy near the base and on the nerves, dotted outside with glistening yellowish glands; upper lobe orbicular, rounded or very shortly acute, shorter than the tube; later and lower lobes narrow and awned, the lowest longest, minutely hispid. *Corolla* minutely puberulous without, tube ·66 in. long, very slender, rarely cylindric, lobes rounded, upto ·5 in. long, lower entire; upper 3-fid *Stamens* inserted near the mouth of the corolla tube, filaments capillary, mauve, upto 3 in long; anthers very small. *Disc* glabrous, shallowly lobed. *Ovary* glabrous; style filiform as far exserted as the stamens or slightly further, glabrous; stigma ·66 in. long, upper lobe slightly convex, nerves prominent. *Nutlets* ellipsoid, slightly compressed, slightly narrowed to the base; ·12-·17 in long, brown; testa raised, reticulate

LUSHAI HILLS (3,000 ft).

Flrs 7-8

O. Wattii *Prain*

Stem leafy, puberulous, 4-angled *Leaves* decussately paired, irregularly cordate, acutely lobed, sub-acuminate, thick, sparsely puberulous above. *Racemes* simple, bracts broadly cordate, acuminate *Calyx* campanulate, puberulous; 2 lower teeth subulate. *Corolla* tube slender; lower lip concave; upper 3-fid. *Filaments* naked.

ASSAM, MANIPUR, NAGA HILLS

3. MESONA Blume.

Mesona Wallichiana *Benth.*

An aromatic annual; stem hairy at the nodes. *Leaves* ·5-1·5 by ·2-·5 in., ovate or narrow-lanceolate, acute, serrate, membranous, narrowed into a short petiole ·2-·6 in. long. *Flowers* small in many flowered racemed whorls. *Fruiting*

calyx declinate, bilabiate. *Stamens* 4; filaments exserted, upper filaments toothed. *Nutlets* ellipsoid.

KHASI HILLS (4,000 ft).

Flrs. 10. Fr. Cold season

4. ACROCEPHALUS Benth.

Acrocephalus indicus (*Burm. f.*) *O. Ktze.*=A. capitatus Benth & Acrocephalus axillaris Benth.

Two annuals with whorls of small flowers in dense heads with imbricate bracts and filaments included; also occur in the regions of the Flora.

5. GENIOSPORUM Wall

Geniosporum strobiliferum *Wall.* Vern. *Bon-Tulsi*, Ass.

Shrubby, 5-7 ft. high; stem -puberulous, obscurely quadrangular. *Leaves* 1-4 by ·3-1·2 in., (not aromatic), ovate-lanceolate, serrate, acuminate or acute, membranous, puberulous; base cuneate; petiole ·2-·5 in. long. *Flowers* small, white in dense spikes; bracts whitish. *Fruiting* calyx erect, pubescent; upper lip with 2 glands; throat glabrous. *Corolla* with purplish veins. *Nutlets* ellipsoid, black, hairy at the apex.

KHASI HILLS, KAMRUP.

Flrs. & Fr. 4-10.

6. ANISOCHILUS Wall

Herbs or undershrubs, often fleshy. *Flowers* small, in dense spicate whorls. *Calyx* very oblique, inflated below the middle, suberect, usually bilabiate or 5-toothed; upper lip entire and deflexed. *Corolla* bilabiate; tube slender, inflated above and recurved. *Stamens* 4, declinate, didynamous; filaments free; anther-cells confluent. *Disc* lobed. *Ovary* 4-partite; style bifid. *Fruit* of 4 dry nutlets; basal scar small.

Anisochilus pallidus *Wall.*

A tall branched puberulous annual. *Leaves* 1·5-7 in. long, long-petioled, ovate-lanceolate, acuminate, dentate, membranous. *Spikes*

panicled. *Fruiting* calyx tomentose like a "cat's claw" (*F.B.I.*) recurved beak of upper lip closing the mouth

KHASI HILLS.

Flrs. 4.

Anisochilus polystachyus *Benth.*

A rigid robust herb; stem strict hoary. *Leaves* 1·5-6 in., subsessile, lanceolate, acuminate, serrate, membranous. *Spikes* paniculed. *Fruiting* calyx tomentose slit in front; mouth very oblique, not quite closed by the 5-toothed recurved lip

KHASI HILLS.

Flrs. 4.

Microtœna cymosa *Prain* Syn. M. insuavis Dunn.

Leaves 1-2·5 by ·5-1·8 in., ovate or ovate-lanceolate, shortly acuminate or acute, serrate, membranous, hairy on both surfaces. *Flowers* in paniculate cymes. *Calyx* hairy outside *Corolla* ·6 in. long, bilabiate.

KHASI HILLS, MANIPUR.

Smells very slightly of Patchauli (oil and perfume), which is also obtainable from the plant

Flrs. 11. Fr 7.

7. PLECTRANTHUS L'Herit.

Herbs or undershrubs; stem usually more or less quadrangular. *Leaves* opposite or terete *Flowers* small, in panicled or racemose 6-8 flowered cymes or whorls. *Calyx* 2-lipped, 5-toothed, enlarged in fruit. *Corolla* 2-lipped; tube exserted, long or short, straight or recurved; limb equal or gibbous; upper lip usually short, 4-fid, recurved; the lower much longer, entire, boat-shaped, narrow or stipitate at the base. *Stamens* 4, declinate, didynamous; filaments free; anther-cells usually confluent. *Disc* large, usually produced in front. *Ovary* 4-partite; style slender, subequal, 2-fid. *Fruit* of 4 orbicular, ovoid or oblong, granulate or punctate nutlets; basal scar small.

Fruiting calyx broad, deeply bilabiate; upper lip with 3 distinct spines; lower lip of 2 long subulate teeth :—

Stamens sparsely hairy Leaves ovate-lanceolate. . .. . 1. *P. macranthus.*

Fruiting calyx indistinctly bilabiate Calyx teeth subequal and similar. Leaves opposite :—
Fruiting calyx glabrous or nearly so :—
Corolla white; upper lip spotted. .. 2. *P. Gerardianus.*
Fruiting calyx hispid :—
Corolla white. .. .. .. 3 *P. striatus*
Fruiting calyx minute, densely woolly :—
Corolla white, speckled with red. .. 4. *P. hispidus.*
Fruiting calyx narrow, bilabiate; teeth acute :—
Fruiting calyx scaberulous :—
Corolla recurved, lavender-blue. .. 5. *P. Coetsa*
Fruiting calyx sub-hispid :—
Corolla gibbously hemispheric. .. 6 *P. melissoides*
Fruiting calyx 2-lipped; upper lip large :—
Stem hoary; upper calyx segments broadly ovate. .. .. 7 *P. incanus.*
Stem hirsutely tomentose :—
Nutlets black, shining. .. .. 8. *P. Griffithii.*
Stem finely tomentose (not hirsute) :—
Nutlets black, granulate, opaque. .. 9. *P. crenulatus.*
Fruiting calyx equally 5-toothed :—
Corolla base gibbous :—
Leaves usually ternately whorled. .. 10 *P. ternifolius.*

1. Plectranthus macranthus *Hook. f.*

A sparsely hairy perennial, shrubby, 6-12 in. in height. *Leaves* 2-4 by ·8-1·2 in., ovate-lanceolate or elliptic-lanceolate, coarsely serrate, membranous, acute; base acute or cuneate; petiole ·2-·3 in. long. *Flowers* in racemes. *Corolla* about 1 in. long, tube straight. *Nutlets* globose.

KHASI HILLS (5,000 ft.)

Flrs. 8.

P. scrophularoides *Wall.* A straggling shrub. Flowers white.

NAGA HILLS, 1,500 M. (Bor. 6,514).

Flrs. 9.

2. Plectranthus Gerardianus *Benth.*

An almost glabrous branched perennial. *Leaves* 2-6 by 1·2-5 in., ovate or ovate-lanceolate, acuminate, crenate or toothed, membranous, tough, sparsely hairy, lower surface gland-dotted; base narrowed into a short petiole ·1-·2 in.

long. *Flowers* in panicled cymes. *Calyx* gland-dotted. *Nutlets* ellipsoid.

KHASI HILLS (6,000 ft.)

Flrs. 10. Fr. Cold season

Var. graciliflora *Benth.* Shrubby, about 5 ft. high; stem 4-gonous, reddish brown. *Leaves* conspicuously scabrid above, drying red-brown.

KHASI HILLS.

Flrs. 10. Fr. Cold season

3. Plectranthus striatus *Benth.*

A pubescent or hairy shrubby, perennial. *Leaves* 1-4 by ·5-2 in., ovate, crenate, acuminate, membranous, scaberulous. *Flowers* in panicled cymes. *Calyx* hispid, enlarged and recurved in fruit. *Corolla* white, longer than the calyx. *Nutlets* oblong.

KHASI HILLS (6,000 ft.).

Flrs. 10. Fr. Cold season

4. Plectranthus hispidus *Benth.*

A stout erect perennial, shrubby, scaberulous, densely woolly. *Calyx* woolly. *Nutlets* very minute, ellipsoid

KHASI HILLS (3-4,000 ft.).

Flrs. & Fr. 9-11.

5. Plectranthus Coetsa *Ham.*

A tall erect strongly, aromatic pubescent perennial, shrubby. *Leaves* 1-3 by ·5-1·5 in., ovate or ovate-lanceolate, crenate or sharply dentate, acuminate, membranous, sparsely puberulous; petiole up to 1 in. long. *Flowers* lavender-blue in paniculate cymes. *Calyx* hispid, enlarged and recurved in fruit.

KHASI HILLS.

Flrs. 1 Fr. Hot season.

6. Plectranthus melissoides *Benth.*

A tomentose erect herb. *Leaves* ·5-1·5 in., ovate, crenate, membranous, hairy on both surfaces, specially along

the nerves. *Flowers* pinkish, on laxly flowered racemose cymes. *Fruiting* calyx hairy.

KHASI HILLS (6,000 ft.).

Flrs. & Fr. 8.

7. Plectranthus incanus *Link.*

A hoary pubescent herb. *Leaves* 2-4 by 1·75-3·5 in., ovate-cordate, velvety, acute, gland-dotted beneath, crenate; petiole upto 4 in. long. *Flowers* pale lilac or light blue. *Calyx* enlarged in fruit; lower lip with 4 subulate teeth. *Nutlets* ·09 in. across, spotted, sub-globose, grey-brown.

KHASI HILLS.

Flrs. 8-10 Fr. Cold season.

8. Plectranthus Griffithii *Hook. f.*

An erect hirsutely tomentose annual; shrubby; stem woody. *Leaves* 3-5 in., ovate-acuminate, crenate or dentate, long-acuminate, hirsutely tomentose; base rounded or cordate; petiole upto 1·5 in. long. *Flowers* in slender racemose cymes. *Fruiting calyx* sparsely hairy; lips subequal. *Corolla* tube declinate; lips subequal. *Nutlets* black, shining, orbicular.

N.-E. F. TRACT.

Flrs. & Fr. Cold season

9. Plectranthus crenulatus *Hook. f.*

An erect finely tomentose woody perennial. *Leaves* ovate-acute, crenulate. *Flowers* in axillary racemose cymes. *Fruiting* calyx hairy. *Nutlets* orbicular, black, granulate, opaque.

LAKHIMPUR (Kamrup).

10. Plectranthus ternifolius *Don.* Vern. *Mirna-koutung-asing,* Miri; *Ja-ram-reu,* Khasi.

A robust, densely tomentose undershrub. *Leaves* 2-6 by ·5-1·5 in., ternately whorled, subsessile, lanceolate-acuminate, serrate, coriaceous, rugose above, densely tomentose.

Flowers in dense cymose whorls on densely tomentose panicled spikes. *Fruiting* calyx subequally toothed. *Corolla* white, spotted pink on the upper lip, gibbous above the base; tube recurved. *Nutlets* acuminate, 3-gonous, ovoid-oblong.

N E F. TRACT, DARRANG, KAMRUP, KHASI HILLS.

Flrs. 9-11. Fr 1-3.

8. COLEUS Lour.

Coleus Blumei *Benth.*—is commonly cultivated. The leaves are mottled with deep purple or sanguine. *Stamens* 1 (Bot. Mag. 4754). A form of above is found gregarious occurring in N. E. F. Tract (Kanjilal No. 3217). *Leaves* ·5-1 in. by ·4-1 in., ovate or orbicular, coarsely and obtusely crenate with brown blotches. *Hood* of corolla teeth with orange dots outside.

Flrs. 4-5.

9. POGOSTEMON Desf.

Herbs or shrubs, often aromatic. *Flowers* small, in whorls or cymes, arranged in spikes or racemes. *Calyx* subequally 4-5-toothed. *Corolla* tube exserted or included, sub-2-lipped; the upper lip 3-lobed; the lower narrow and longer. *Stamens* 4, exserted, straight or declinate; filaments usually bearded; anther-cells confluent. *Disc* subentire; style bifid. *Nutlets* ovoid or ellipsoid.

Whorls forming continuous spikes :—
  Stem villous or hoary pubescent :—
    Bracts glandular exceeding the calyx :—
      Calyx teeth short, triangular, lanceolate .. .. 1. *P. plectranthoides.*
    Bracts falcate equalling the calyx :—
      Calyx teeth as long as the tube, subulate 2 *P. purpurascens*
    Bracts ovate, equalling the villous calyx :—
      Calyx teeth shortly lanceolate. .. 3. *P. villosus.*
  Stem scaberulous or glabrate :—
    Bracts elliptic-ovate, exceeding the purplish calyx :—
      Calyx teeth short, triangular, lanceolate, ciliate. .. .. 4. *P. parviflorus.*

Stem laxly hairy, flexuous:—
Bracts obliquely ovate, sub-orbicular, membranous, imbricate:—
Calyx teeth lanceolate, ciliate. .. 5 *P. paniculatus.*
Whorls usually distant, forming interrupted spikes :—
Stem.—young parts tomentose:—
Calyx small, hoary; teeth sub-acute, not ciliate. Corolla purple .. .. 6. *P. elsholtzioides.*

1. Pogostemon plectranthoides *Desf.* Vern. *Bakoha,* Beng.

A large branching aromatic shrub; branches often dark purple; young parts hoary pubescent. *Leaves* 2-6 by 1-3 in., ovate or ovate-lanceolate, acute or acuminate, doubly serrate, rather subcoriaceous, sometimes pubescent, generally glabrescent; lateral nerves 3-6 on either half, oblique, arcuate, prominent beneath; base rounded or cuneate; petiole 1-3 in. long. *Flowers* white or pale pinkish, in capitate whorls or pubescent panicled terminal and axillary spikes. *Bracts* foliaceous, ovate-acuminate, glandular, exceeding the flower-buds, usually tinged pinkish, villous. *Calyx* glandular hairy, ·15-2 in. long; teeth shorter than the tube. *Corolla* about ·2 in. long. *Stamens* bearded with light purple jointed hairs. *Nutlets* minute, dark-brown, compressed and polished when ripe.

GOALPARA

Used as a fence by Mech. and Rajbangshis, medicinal uses similar to that of P parviflorus

Flrs. 2. Fr. Hot season.

2. Pogostemon purpurascens *Dalz.*

An erect branched herb. *Leaves* 2·7 by 1-3·5 in., ovate-acute, doubly serrate, softly hairy on both sides. *Calyx* teeth as long as the tube, upper lip of corolla purplish. *Nutlets* ovoid, compressed, inner face angled.

MANIPUR (*Watt*).

Used like P parviflorus *Benth.*

3. Pogostemon villosus *Benth.*

A stout erect villous herb. *Leaves* ovate-acuminate, crenulate. *Flowers* densely crowded in panicled spikes. *Calyx* villous.

KAMRUP.

Flrs 2. Fr. Hot season.

4. Pogostemon parviflorus *Benth.*

Shrubby; stem quadrangular, usually purplish. *Leaves* 1·5-6 by 1-3·5 in., ovate or ovate-lanceolate, acute or acuminate, irregularly or doubly crenate or toothed, membranous, scaberulous above, usally glabrous beneath; petiole 2-2·5 in. long. *Flowers* in dense panicled spikes. *Calyx* ·16 in. long, glandular pubescent; teeth short. *Corolla* white. *Filaments* beaked with purplish hairs. *Nutlets* ellipsoid, inner face angled.

LOWER ASSAM.

The fresh leaves when bruised are applied as a cataplasm inside to clean wound and provide healthy granulation. The roots are reputed to be a remedy for snake bite (*I.M.P.*)

Flrs. 10-12 Fr. Cold season.

5. Pogostemon paniculatus *Benth.*

A branched herb. *Leaves* 3-6 by 2-4 in., pairs unequal, ovate, irregularly inciso-serrate, rather thinly membranous, hairy; base cuneate; petiole·8-1·8 in. long. *Bracts* obliquely suborbicular, pubescent, veined, imbricate. *Nutlets* smooth, ovoid.

KHASI HILLS (Mann 64).

6. Pogostemon elsholtzioides *Benth.*

Shrubby 6-8 ft. high; young parts hoary tomentose; mature branches light purplish. *Leaves* aromatic, 1·5-4 by ·5-1 in., lanceolate-acuminate, serrulate, sub-coriaceous, glabrescent above, glabrous beneath; base acute; petiole

·1-·2 in. long; spikes up to 4 in. long. *Calyx* hoary not ciliate; teeth unequal. *Corolla* purplish.

GOALPARA, MANIPUR, NAGA HILLS, KHASI HILLS (5,000 ft.).

Flrs. & Fr. Cold season

P. glaber *Benth.*, P. fraternus *Miquel.*, P. strigosus *Benth.*, P. brachystachys *Benth.*, are herbs recorded from the region of the flora.

P. hispidus *Prain.*

An undershrub, erect, ·3-·4 in. high; stem tetragonous, purplish, partially pubescent *Leaves* 2·3-3·2 by 1·2-2 in., decussate, ovate-acute or acuminate, dentate-serrate except towards the base, herbaceous; nerves above sparsely appressed, pubescent; nerves beneath sparsely hispid; base cuneate; petiole ·6-1 in. long, sparsely appressed hispid. *Verticellaster* in simple spikes or sparingly branched; peduncles ·6-1·6 in. long, appressed pubescent; bracts-ovate or ovate-lanceolate, often foliaceous, largest 3·2 in. long, 1·2·2 in. broad. *Calyx* narrowly campanulate, ·17 in long, sparingly hispid without; segments triangular, acute, equal; tube short *Corolla* pale lilac, ·17 in long, glabrous; lobes sub-equal. *Filaments* lilac, sub-ascendingly branched; style branches sub-equal. ·05 in. long. *Nutlets* (nucule) ovoid glabrous.

K & J. HILLS (Hooker & Thompson)

10. DYSOPHYLLA Blume.

Herbs. *Leaves* opposite or whorled. *Flowers* minute, in dense whorls collected into close terminal spikes. *Calyx* equally 5-toothed; throat naked. *Corolla* equally 4-lobed; tube exserted. *Stamens* 4, exserted, straight or subdeclinate; filaments very long, bearded; anther-cells confluent. *Disk* regular, subentire. *Nutlets* smooth or rough, ovoid or oblong.

Leaves opposite (in pairs):—
  Stem with spreading hairs:—
    Corolla usually pinkish. .. .. 1. *D auriculata.*
Leaves in whorls:—
  Stem and leaves hairy:—
    Leaves narrowly oblong or lanceolate, serrate or sub-entire. Calyx sometimes glabrate. .. .. 2. *D. quadrifolia.*
    Leaves linear, entire:—
      Calyx villous. .. .. .. 3. *D. cruciata.*

Stem hairy at the nodes and leaves sparsely hairy or glabrate —
Leaves linear; margins revolute, spikes short upto 2 in. Calyx glabrous. .. 4. *D. linearis.*
Stem and leaves glabrous or nearly so.—
Fruiting calyx stellate, spreading. .. 5. *D. verticillata*
Fruiting calyx not stellately spreading (erect or conniving). .. .. .. 6. *D. crassicaulis.*

1. Dysophylla auricularia *Blume.*

A hairy coarse annual. *Leaves* 1-3 by ·5-1 in., ovate-lanceolate or ovate-oblong, acute, serrate, hairy; petiole 0·1 in. long. *Calyx* enlarged in fruit; mouth closed by the inflexed teeth. *Nutlets* ellipsoid, pale brown, smooth.

KHASI HILLS (4,000 ft).

Flrs. 6. Fr Cold season

2. Dysophylla quadrifolia *Benth.*

A perennial with thick root-stock extremities; young parts tomentose. *Leaves* 1-3 by ·1·2 in., linear-oblong, serrate or subentire, tomentosely hairy; petiole 0·1 in. long. *Spike* pinkish, very dense, upto 8 in. long. *Nutlets* very small, ovoid, brown.

KHASI HILLS (4,000 ft.).

Flrs. & Fr. 6-8

3. Dysophylla cruciata *Benth.*

A stout strict erect herb, densely villous. *Leaves* ·7-2 in., sessile, linear, entire, obtuse or subacute, densely villous. *Flowers* pale purple. *Fruiting* calyx teeth erect. *Stamens* purple bearded. *Nutlets* black, smooth, shining, ellipsoid.

KHASI HILLS (4,000 ft.).

Flrs & Fr. 10-3.

4. Dysophylla linearis *Benth.*

An erect annual; stem hairy at the nodes. *Leaves* 1-3·5 in., linear, in whorls of 4, obtuse, margins revolute,

usually entire, sparingly and finely hairy. *Stamens* much exserted, rose coloured, villous.

KHASI HILLS (5,000 ft.).

Flrs. 9. Fr. Cold season.

5. Dysophylla verticillata *Benth.*

An erect branched annual; hollow stemmed. *Leaves* 1-3 by ·1-·2 in., in whorls of 4-10, spreading and deflexed, linear or linear-lanceolate, entire or obscurely serrate, almost glabrous. *Spikes* very dense, upto 2·75 in. long. *Fruiting* calyx conspicuous with stellately spreading teeth. *Nutlets* pale brown.

GARO HILLS.

Flrs. & Fr. Cold season.

6. Dysophylla crassicaulis *Benth.*

Leaves 1-2 by ·1-·2 in., linear-lanceolate. *Spikes* large, upto 4·5 in. long. *Fruiting* calyx teeth erect or conniving. *Nutlets* orbicular, blackish.

KHASI HILLS, SYLHET, ASSAM.

Flrs. & Fr. Cold season

Var. pumila *Benth.* The herb is dwarfish. *Leaves* ·3-·8 by ·05-·1 in., linear-lanceolate. *Spike* dwarfed.
Plains of ASSAM.

Flrs. & Fr. Cold season.

11. ELSHOLTZIA Willd.

Herbs or undershrubs, often aromatic. *Flowers* very small in large whorls, crowded into simple or panicled spikes. *Calyx* erect, 5-toothed, often enlarged in fruit. *Corolla* tube straight or incurved; limb oblique or sub-2- lipped; upper lip notched, erect; lower spreading. *Stamen* 4, divergent or distant; filaments naked; anther-cells divaricate or alternately confluent. *Disc* much produced behind the ovary; style sub-equally 2-fid, with subulate lobes. *Nutlets* smooth, or tubercled.

Spikes panicled:—
Bracts subulate or acicular:—
Corolla yellow:—
Fruiting calyx inflated. Nutlets ellipsoid. .. .. *1. E. flava.*
Corolla white:—
Corolla tube twice as long as the calyx :—
Fruiting calyx narrowly tubular, curved, ribbed to the base. Nutlets oblong Leaves sub-sessile. .. .. *2. E. polystachya*
Corolla tube short:—
Fruiting calyx urceolate, glandular-pubescent. Nutlets broadly ellipsoid. Leaves petioled. .. .. .. *3. E. blanda.*

1. Elsholtzia flava *Benth.* Vern. *Ja-Tang-ning*, Khasi.

A gregarious undershrub upto 8 in. high. *Bark* pale-brown; branchlets quadrangular; whole plant is covered with golden dots. *Leaves* 2-7·5 by 1·5-4·5 in., ovate, long acuminate, crenate or coarsely serrate, membranous, scaberulous above specially along the nerves, closely gland-dotted beneath; lateral nerves 6-8 on either half, oblique, arcuate; petiole ·5-3 in. long, scaberulous. *Inflorescence* dense, axillary and terminal; bracts deciduous, ovate or lanceolate. *Flowers* yellow, ·25 in. long. *Calyx* tubular, inflated, equally 5-toothed. *Corolla* tube twice as long as the calyx. *Nutlets* ellipsoid, dark-brown.

KHASI HILLS (6.000 ft).

Flrs. 9. Fr. 11.

2. Elsholtzia polystachya *Benth.* Vern. *Ja-tonuing-rit*, Khasi.

A pubescent shrub up to 8 in. high. *Bark* fibrous, peeling off in longitudinal strips; branchlets obscurely quadrangular. *Leaves* 1-2·5 by ·5-2 in., elliptic-lanceolate, acuminate, serrate or crenulate, thinly coriaceous, pubescent, gland-dotted beneath; lateral nerves prominent beneath; base narrowed into the petiole 0-·1 in. long. *Spikes* 4-10 in. long. *Flowers* minute. *Fruiting* calyx tubular, curved, ribbed at

the base; teeth 5, erect. *Corolla* white, pubescent. *Nutlets* oblong.

KHASI HILLS.

Flrs. 9-10. Fr. Cold season

3. Elsholtzia blanda *Benth.*

A shrubby perennial; branches obscurely quadrangular. *Leaves* very sweet scented, 1-5 by ·3-1 in., lanceolate, narrow-elliptic, acuminate, serrate, membranous, puberulous above, closely gland-dotted beneath; base narrowed into the petiole ·05-·4 in. long. *Spikes* 2-4·5 in. long. *Fruiting* calyx urceolate, glandular, pubescent, short; mouth contracted. *Corolla* tube short, sparingly pubescent. *Nutlets* ellipsoid.

N. E. F. TRACT, KHASI HILLS.

Flrs. 11. Fr. Cold season.

E. Griffithii *Hook. f.*, E. pilosa *Benth.*, E. cristata *Willd.* are herbaceous plants recorded from the region of the flora.

E. Thomsoni *Hk. f.* Vern *Duera*, Garo.
Flowers pale-mauve.
GARO HILLS (Richu).

E. communis *Coll. et Hemsl.* (Dysophylla communis Coll. et Hemsl).

Herb, puberulous; branches tetragonous. *Leaves* about 3·5 in. long, opposite, oblong, membranous, obtuse, crenate; base alternate. *Flowers* rosy in dense terminal cylindrical spike. *Calyx* cylindric, puberulous, 5-toothed (equal). *Corolla* pilose outside. *Stamens* shortly exserted; filaments glabrous *Fruit* not seen.
Shan Hills (4,000 ft.).

12. PERILLA Linn

Perilla ocimoides *Linn.* Vern. *Arim*, Garo; *Kenia*, *Angami*, Naga.

A strongly aromatic bush, about 2-4 ft. high; stem leaves and petiole covered with grey hairs. *Leaves* 2-4·5 by 1-3 in., ovate or sub-orbicular, coarsely serrate, acuminate, membranous, scaberulous above, hairy beneath specially along the nerves; petiole 1-3 in. long. *Flowers* small, white, in axillary or terminal spicate racemes. *Fruiting* calyx villous.

Corolla campanulate, 5-fid; lobes unequal. *Stamens* 4, subequal, erect, distant; anther-cells distinct, parallel, afterwards diverging; style equally 2-fid. *Nutlets* coarsely reticulate, subglobose.

KHASI HILLS (5,000 ft.), NAGA HILLS, SIBSAGAR.
The Nagas eat leaves and seeds

Flrs. & Fr. Cold season.

13. MENTHA Linn.

Mentha arvensis *Linn. Pudnia* Kh.; *Padina*, Beng. Cultivated throughout the province, also runs wild in KHASI HILLS.

The dried plant is refrigerant, stomachic, diuretic and stimulant (*I.M.P.*). A *chutney* is made from the leaves with tamarind.

M. piperita *Linn.* The peppermint Cultivated, officinal in Pharmacopœia.

14. MOSLA Ham.

Mosla dianthera *Maximovicz.*

A strongly scented erect herb. *Leaves* ·5-·15 by ·2-·3 in., ovate, acute, serrate, membranous, glandular-punctate below; petiole ·2-·5 in. long. *Flowers* minute in slender terminal racemes. *Calyx* campanulate, 5-toothed, enlarging in fruit. *Corolla* white or purplish. *Stamens* 2, staminodes 2; anther-cells 2, divaricate. *Nutlets* globose, reticulate.

KHASI HILLS (4,000 ft.).

Flrs. Hot season. Fr. 6.

15. CALAMINTHA Mœnch.

Calamintha repens *Benth.*

A sparsely hairy decurrent herb. *Leaves* ·5-1·5 by ·4-·8 in., ovate, toothed, acute. *Flowers* small, in dense whorls, panicled or spicate. *Calyx* 13-nerved ·25 in. long. *Corolla* bilabiate; throat villous. *Stamens* 4, didynamous. *Nutlets* subglobose, smooth.

KHASI HILLS

Flrs. & Fr. 7-11.

16. MELISSA Linn.

Melissa parviflora *Benth.*

A gregarious herb. *Leaves* ·5-3 by ·4-1 in., ovate or ovate-lanceolate, acute, serrate, membranous, glabrous; base acute or rounded; petiole ·1-·6 in. *Flowers* white, numerous, in axillary whorls. *Calyx* ribbed; teeth variable. *Corolla* tube recurved, exceeding the calyx; upper lip erect; lower lip spreading, 3-lobed. *Stamens* 4; anther-cells ultimately divaricate. *Nutlets* narrowly obovoid, darkish, smooth.

KHASI HILLS (5,000 ft.).

Used for stomach ache; also in liver and heart diseases and weakness of sight, etc. (*I.M.P.*).

Flrs. 7-9. Fr. Cold season.

17. MERIANDRA Benth.

Meriandra bengalensis *Benth.* The Bengal sage.

A shrub strongly smelling of camphor. *Leaves* 2-3 in. long, obtuse; base rounded; petiole ·2-·5 in. long. *Flowers* white in globose whorls in terminal spikes.

Cultivated in Indian garden, imported from Abyssinia. Possesses the properties of sage (*Salvia officianalis*).

18. SALVIA Linn.

Salvia saxicola *Wall.*

A dwarf, almost scapigerous, perennial with woody-root-stock. *Leaves* 1-3 in. across, broadly ovate or sub-orbicular, coarsely crenate, almost scaberulous above, hairy beneath along the nerves, cordate; petiole ·5-3 in. long. *Scape* 5-10 in. long. *Calyx* enlarged in fruit, glandular hairy. *Corolla* short, purplish. *Stamens* 2, perfect, connective with the antheriferous arm, decurved; the other shorter, acute (*F.B.I.*). *Nutlets* ellipsoid, smooth, ·1 in. long.

KHASI HILLS (5,000 ft.).

Flrs. 6. Fr. Rainy season.

Salvia coccinea *Linn.*

A slender herb attaining about 2 ft. with beautiful scarlet flowers; often cultivated in gardens.

19. SCUTELLARIA Linn.

Herbs or undershrubs. *Inflorescence* various. *Calyx* 2-lipped, closed in fruit; upper lip furnished with a large broad shield-like or pouch-like scale, finally deciduous. *Corolla* bilabiate; tube usually sharply recurved from the base, erect (not annulate within); upper lip entire or notched, lower 3-lobed. *Stamens* 4; anthers conniving, ciliate; lower 1-celled; upper 2-celled. *Disc* elongate *Ovary* oblique. *Nutlets* 4, minute, granulate or hispidulous.

Flowers racemose:—		
Bracts (almost all) shorter than the pedicel and calyx:—		
Stem minutely pubescent. Leaves purple beneath Nutlets tuberculate. .. .	1	*S. discolor.*
Bracts longer than the pedicels and calyx:—		
Stem dwarf, glandular hairy :—		
Corolla ·3 in. Leaves sessile. .	2.	*S. glandulosa.*
Stem 2-3 ft., glabrescent:—		
Corolla 5 in. Leaves long, petiolate	3	*S khasiana*
Flowers spicate, axillary :—		
Stem dwarf, glabrous —		
Corolla ·2-·5 in Leaves shortly petioled Nutlets granulate	4.	*S rivularis*

1. Scutellaria discolor *Coleb.*

A pubescent annual. *Leaves* 1-3 by ·5-1·5 in., chiefly radical, rosulate, orbicular or oblong or elliptic, obtuse, crenate, pubescent; base rounded or cordate; petiole upto 2 in. long. *Flowers* trumpet shaped, generally all forming the same cluster ·6-1 in. long, bluish purple on erect racemes; lip of corolla whitish above; upper lip hooded. *Nutlets* 4, disclosed after the fall of upper calyx lip, granulate, turbinate.

KHASI HILLS

Flrs. & Fr. 9-2.

2. Scutellaria glandulosa *Hk. f.*

A dwarf herb. glandular-hairy. *Leaves* 1·5-2·5 by ·8-1·4 in., oblong-lanceolate, obtuse, irregularly serrate, sparsely hairy. *Flowers* opposite in glandular racemes.

KHASI HILLS.

The paste of the leaves is used for cuts.

Flrs. 4-7.

3. Scutellaria khasiana *Clarke.*

A glabrescent herb 2-3 ft. high. *Leaves* 1·5-2 in., ovate-acute, crenate, membranous, glabrous; base acute. *Racemes* pubescent. *Corolla* pale blue. *Nutlets* granulate.

KHASI HILLS, NAGA HILLS.

4. Scutellaria rivularis *Wall.*

A dwarf, glabrous herb with stem creeping below. *Leaves* ·5-1·5 by ·2-·4 in., ovate or lanceolate, entire or crenate; base rounded or cordate; petiole 0-·2 in. long. *Racemes* all axillary, spicate. *Nutlets* granulate.

KHASI HILLS (4,000 ft.)

Flrs. 5-10. Fr. Cold season.

20. BRUNELLA Linn.

Brunella vulgaris *Linn.*

A perennial with creeping woody root-stock. *Leaves* ·5-2 by ·3-·8 in., ovate or ovate-lanceolate, subobtuse, usually entire or obscurely toothed, hispidly hairy on both sides; petiole upto 1·5 in. long. *Flowers* deep blue in dense whorls collected in compact heads; bracts ovate-cordate, ciliate, apiculate. *Stamens* 4, didynamous, exserted. *Disc* erect. *Ovary* on a gonophore. *Nutlets* smooth, oblong.

KHASI HILLS.

The green leaves smeared with castor-oil is also applied externally in case of painful piles.

Regarded as expectorant and antispasmodic.

Flrs. 6-7. Fr. Cold season.

21. CRANIOTOME Reichb.

Craniotome versicolor *Reichb.*

A softly hirsute perennial. *Leaves* 1 by ·8-2 in., broadly ovate-acuminate, toothed or crenate, hirsute on both sides, cordate; petiole upto 1·8 in. long. *Flowers* minute, crowded in cymes forming terminal panicle. *Calyx* ovoid, enlarged in fruit, equally 5-toothed. *Corolla* far exceeding the calyx,

bilabiate; upper lip hooded. *Stamens* 4, in unequal pairs; anther-cells didynamous, alternately diverging. *Nutlets* minute, sub-globose, pale, shining.

KHASI HILLS.

Flrs. & Fr. 8-11

22. ANISOMELÉS Br.

Anisomeles ovata *Br.* Vern. *U-nei-maias,* Khasi; *Bontil,* Ass.

A shrub-like, strongly scented, pubescent or tomentose herb. *Leaves* 1-3 by ·8-1·5 in., ovate, coarsely crenate, acuminate, softly pubescent or tomentose; **petiole upto 1·5 in.** long, densely hairy. *Flowers* purplish blue, in dense-flowered whorls on terminal shoots; lower whorls arising from leaf axils. *Calyx* ·3 in. long, tubular, hirsute; teeth acuminate, enlarging in fruit. *Corolla* ·6-·7 in. long, 2-lipped; tube short; upper lip pale purple, short, entire, erect; lower sparsely 3-lobed; mid-lobe 2-fid. *Stamens* exserted, didynamous; filaments hairy or bearded. *Nutlets* smooth, black, ovoid, ·1 in. long.

Plains of ASSAM.

An oil is distilled from it which found useful in uterine affections. It has also corrective astringent and tonic properties. *(I M P.)*

Flrs. 10. Fr. 1-2.

23. COLQUHOUNIA Wall

Tall robust plants, shrubby, usually rambling; branches terete. *Flowers* orange or pinkish, in axillary whorls or laxfid, spikes or racemes. *Calyx* sub-equally 5-toothed; throat naked, 10-nerved. *Corolla* bilabiate; tube incurved, narrowed; throat inflated; upper lip entire or notched; lower 3-lobed. *Stamens* 4; anther-cells divergent; style subequally 2-fid. *Nutlets* lip produced into a wing.

Flowers usually in axillary clusters or terminal racemes, stellately hairy :—
  Calyx teeth triangular:—
    Corolla often glandular hairy at the lip, reddish or orange, wing of nutlets not entire. .. .. 1 *C coccinea.*

Flowers in axillary capitate whorls, pubescent with simple hairs:—
Calyx teeth acuminate:—
Corolla not glandular hairy at the lip, wing of nutlets entire. .. .. .. 2. *C. elegans.*
Flowers in terminal or axillary spikes or in axillary clusters, densely woolly:—
Calyx woolly:—
Corolla rosy pink, 1·25 in. long. .. 3. *C. vestita.*

1. Colquhounia coccinea *Wall.* Vern. *Dieng-ja-long-skei, Jalong-sykei,* Khasi.

A rambling shrub 8-10 ft. high, tomentose or stellately hairy on stem and leaves. *Leaves* 1·5-5 by ·5-2·5 in., ovate or ovate-lanceolate, acuminate or acute, coarsely crenate, subcoriaceous, stellately hairy above, stellately whitish tomentose beneath; lateral nerves 8-11 on either half, oblique, impressed above, prominent beneath; base usually rounded; petiole ·3-1·2 in. long. *Flowers* orange or reddish, usually in axillary clusters or termnial racemes. *Calyx* about ·5 in. long, stellately tomentose; teeth triangular. *Corolla* 1·4 in. long, hairs many celled, glandular at the lip. *Nutelts* compressed, wings sub-laciniate not longer than the body of the nut.

KHASI HILLS.

Flrs. & Fr. 8-2.

2. Colquhounia elegans *Wall.*

A shrub, 8-10 ft. high, tomentose or with simple hairs on stems. *Leaves* 2-4 by 1-1·9 in., ovate-elliptic, acuminate, serrate, coriaceous, tomentose; lateral nerves 4-5 on either half; base cuneate; petiole ·2-·8 in. long. *Flowers* in axillary capitate whorls. *Calyx* ·3 in. long; teeth acuminate. *Corolla* tube bearded, far exceeding the calyx: hairs few celled, glandular at base. *Nutlets* flattened, wings of nutlets entire, acute, longer than the body of the nut.

MANIPUR, KHASI HILLS.

Flrs. 2-3. Fr. 11.

3. Colquhounia vestita *Wall.*

A shrub, densely woolly. *Leaves* 1·5-5·5 by ·75-2·5 in., ovate, elliptic-lanceolate, elliptic-ovate, irregularly crenate, acuminate, rather sub-coriaceous, stellately tomentose on both surfaces, rugose above; lateral nerves 9-12 on either half, prominent beneath, oblique, subparallel; petiole ·3-1·2 in. long. *Flowers* rose pinkish, in axillary clusters or axillary and terminal spikes. *Calyx* funnel-shaped, woolly; teeth triangular. *Corolla* 1-1·25 in. long, hairy outside.

KHASI HILLS, (6,000 ft.) MISHMI HILLS (Griffith)

Flrs. 7

I do not notice very much specific difference with C. coccinea *Wall.* There is slight difference in the inflorescence and the length of the corolla. There is also evidence that the pubescence to some extent becomes stellate in the Khasi Hills species. I agree with Brandis and consider it a form of C. coccinea *Wall.*

Colquhounia Seguini *Van.* (Bull. Acad Georgr Bot XIV (1904) (165).

A straggling shrub, glabrous; young parts somewhat puberulous; branches opposite *Leaves* long-petiolate, acuminate, alternate, ovate-oblong, glabrous; base attenuate or cuneate *Flowers* dull red, medium-sized in few flowered verticillaster (whorls) *Calyx* glabrous, sub-incurved, 10-striate, 5-toothed; teeth unequal, triangular, broad. *Corolla* red *Nutlet* blackish, dry; samara-shaped.

CHINA, LUSHAI HILLS (4,000 ft.). (Wenger 436).

24. LEONURUS Linn.

Leonurus sibiricus *Linn.*

An annual, 3-6 ft. high; stem quadrangular, tomentose. *Leaves* 2-4·5 by ·5-1·4 in., pinnatipartite or palmatipartite, lobes again incised, tomentose; petiole slender 0-·5 in. long. *Flowers* reddish in axillary densely flowered numerous whorls; bracts subulate. *Calyx* 5-nerved, ·25 in. long; teeth 5, spinescent. *Corolla* tube straight, not annulate. *Stamens* 4; anthers conniving, cells transverse. *Nutlets* ·1 in. long, 3-quetrous, truncate, glabrous.

SYLHET

The root, leaves and juice are used as a febrifuge (*I.M.P.*).

Flrs. & Fr. 1-4.

25. LEUCAS Br.

Herbs, undershubs or shrubs, usually pubescent or villous. *Flowers* usually white, in axillary, usually distant whorls, rarely crowded or quite terminal. *Calyx* tubular, 10-nerved, equally or unequally 6-10-toothed, mouth regular or oblique. *Corolla* tube bilabiate, included, annulate or naked within, upper lip erect, concave or hooded, villous at the top; lower spreading, 3-fid, with very large mid-lobe. *Stamens* 4, ascending; anthers conniving, cells divaricate, at length confluent. *Style* subulate, the posterior lobe obsolete. *Nutlets* obtuse, oviod, 3-quetrous; basal scar small.

Annuals:—		
Flowers in terminal or axillary whorls:—		
Calyx tube erect, not bent in the middle; mouth oblique; teeth short; bracts few, short, fairly pubescent.	1.	*L. linifolia.*
Flowers in sub-terminal many flowered whorls:—		
Calyx tube uniform, obliquely imbricate; teeth short; bracts few, linear-ciliate. ..	2.	*L. zeylanica.*
Flowers in very large terminal globose whorls:—		
Calyx tube slightly oblique at the mouth; teeth subequal; bracts membranous, linear-elliptic or lanceolate, curved.	3	*L. cephalotes.*
Flowers in terminal or axillary large globose whorls:—		
Calyx (mouth) straight; teeth spreading, ciliate; throat villous; bracts as long as the calyx, hirsute, densely silky tomentose.		
Leaves membranous, coarsely serrate ..	4.	*L ciliata.*
Perennial:—		
Flowers in dense whorls:—		
Mouth of calyx straight :—		
Calyx teeth rarely spreading, mouth naked; bracts setaceous.	5.	*L. lanata.*

1. Leucas linifolia *Spreng.*

An erect annual; stem pubescent, grooved. *Leaves* 1-4 by ·1-·4 in., linear-lanceolate, entire or distantly shallow crenate-serrate, acute, membranous, finely pubescent; petiole 0-·2 in. long. *Flowers* large, white. *Nutlets* brown, obtuse.

KHASI HILLS

It is believed that the leaves when roasted and eaten with salt, have febrifugal properties.

Fr. 1-3.

2. Leucas zeylanica *Br.*

An erect, pubescent or hispid annual; hairs spreading, deflexed or adpressed. *Leaves* sub-sessile 2·3·5 by ·5··75 in., linear or linear-lanceolate, obtuse, pubescent. *Flowers* white. *Calyx* not prominently nerved, hispid.

CACHAR, ASSAM.

The leaves are bruised and a tea spoonful of the juice is snuffed by the Cenghalese as a remedy for snake bite The fresh juice is also efficacious in head-ache and cold

Flrs. 8-11. Fr. Cold season.

3. Leucas cephalotes *Spreng.*

A stout coarse herb; hairs spreading. *Leaves* 1·5-3 by 1·1·5 in., elliptic-lanceolate or ovate-lanceolate, obtuse, distantly crenate, membranous, more or less pubescent; petiole ·1··5 in. long; bracts prominently nerved.

Plains of ASSAM.

The plant is officinal, being considered stimulant and diphuretic (*I.M.P.*). The seeds yield a medicinal oil (Campbell). The leaves are eaten as a pot-herb (Haines).

Fr. 9-1.

4. Leucas ciliata *Benth.*

A straggling aromatic hirsute annual: branches quadrangular, hairs spreading and deflexed. *Leaves* ·8-2 by ·2··5 in., (Assam record), narrow lanceolate or elliptic-lanceolate, acute, coarsely and shallowly serrate, membranous, pubescent with bulbous hairs; narrowed at base; petiole up to ·6 in. long. *Calyx* teeth ciliate. *Upper* lip of corolla densely clothed with yellowish golden hairs. *Nutlets* oblong, smooth.

KHASI HILLS.

Flrs. 7. Fr. Cold season.

5. Leucas lanata *Benth.* Vern. *Drona*, Sans.; *Dandakalas*, Sylh.; *Guma*, Hind.; *Chandrong-a-an*, Mik.; *Doron*, Ass.

A silky tomentose perennial with woody root-stock, hairs erect or spreading, not deflexed. *Leaves* 1·2·5 by ·2··4 in.,

ovate or suborbicular, crenate-serrate, acute; base obtuse; petiole 0·5 in. long. *Corolla* large white, bilabiate; lower lip longer than the bearded upper.

Young shoots are used as vegetable in the U. P. Tender leaves fried are said to be good for cough. The juice of leaves bruised with lime is used for inflammation

GOALPARA, NOWGONG, N. C. HILLS. Fairly common in SURMA VALLEY—(R. N. De)

Flrs. & Fr. Cold season and hot season.

Phlomis rugosa *Benth*—is recorded from Pongtung—K. & J. HILLS.

26. GOMPHOSTEMMA Wall.

Coarse, stellately pubescent or tomentose herbs or undershrubs; roots sometimes bearing tubers. *Flowers* usually yellow, in short cymes forming whorls which are axillary or in dense terminal spikes; bracts lanceolate or linear. *Calyx* campanulate, 10-nerved, subequally 5-toothed. *Corolla* bilabiate; tube slender, throat dilated; upper lip galeate, lower lip broadly 3-lobed. *Stamens* 4, ascending; anthers connivent in pairs; cells transverse, parallel. *Disk* uniform or produced behind. *Style*-lobes subulate, subequal. *Nutlets* drupaceous, glabrous or pubescent (3-1 by reduction) corky or fleshy.

Upper or all whorls in terminal or axillary spikes:—
- Calyx ·3 in., teeth triangular:—
  - Leaves long petioled 3-12 in. long. .. 1. *G. pedunculatum.*
- Calyx ·6 in., teeth lanceolate :—
  - Leaves sub-sessile, 2-3·5 in., long. .. 2. *G. nutans*

Whorls axillary:—
- Stem stout:—
  - Bracts small, subulate:—
    - Calyx ribbed, ·5 in. long. Corolla 1·5 in., pubescent .. .. .. 3. *G. lucidum.*
  - Bracts slender, membranous:—
    - Calyx ·3 in. long. Corolla ·5 in. .. 4. *G niveum.*
  - Bracts slender or broad and leafy:—
    - Calyx ·3 in. long Corolla 1 in, glabrate. .. .. 5. *G. parviflorum.*
  - Bracts linear or lanceolate, as long as the calyx :—
    - Calyx ·5 in., long. Corolla glabrous, tube very slender, 1 in. long. .. 6. *G. Thomsoni.*

Stem slender, prostrate :—
Leaves puberulous, sparsely hairy, obscurely toothed; base acute:—
Corolla 1·5 in., pubescent; throat inflated. .. .. 7. *G. melissæfolium.*
Leaves densely velvety tomentose, crenate, base cuneate:—
Corolla 1 in. long, throat inflated to some extent . .. .. 8. *G. velutinum.*
Stem slender, short, pubescent:— .
Leaves crenate or rounded or cordate:—
Corolla 2 in. long, pubescent, yellow; tube gradually dilated into the throat. .. 9. *G. Mastersii*

1. Gomphostemma pedunculatum *Benth.*

A tall prostrate perennial. *Leaves* 5-12 by 3-4 in., ovate or elliptic-ovate, acuminate, denticulate, sub-coriaceous, pubescent; lateral nerves 6-8 on either half; base cuneate; petiole 1-1·5 in. long. *Calyx* teeth 5, acute, triangular, hirsute. *Corolla* pale-yellowish, ·6 in. long. *Filaments* hairy. *Nutlets* rugose, subglobose, ·2 in. long.

KHASI HILLS (3,000 ft.). (No specimen in Forest herbarium, Shillong).

2. Gomphostemma nutans *Hook. f.*

A slender perennial. *Leaves* 2-3·5 in., ovate-acute, loculate, pubescent above, glabrous beneath; base acute; petiole ·15-·25 in. long. *Calyx* ·6 in., teeth lanceolate. *Corolla* 1-1·5 in. long. *Nutlets* rugose.

KHASI HILLS.

3. Gomphostemma lucidum *Wall.*

A stout undershrub 6-8 ft. high (stem ferruginous tomentose in Mann's collection). *Leaves* 2·5-7·5 by 1-2·5 in., elliptic, elliptic-lanceolate, acute or acuminate, irregularly and distantly serrate, subcoriaceous, puberulous above, pubescent beneath (almost stellate); lateral nerves 5-7 on either half, oblique; petiole ·3-1 in. *Calyx* pubescent, cupular

in fruit, ·3 in. across. *Corolla* pubescent. *Nutlets* oblong, ·2-·3 in.

KHASI & JAINTIA HILLS.
Flrs. 7. Fr. 9.

4. Gomphostemma niveum *Hook. f.*

An erect, stout perennial; stem tomentose. *Leaves* 8-12 by 3-3·5 in., oblanceolate or elliptic-obovate, acute (acuminate *F.B.I.*), obscurely serrate, coriaceous, glabrous above, white-tomentose beneath; lateral nerves about 8 on either half, impressed above, prominent beneath; base narrowed into the petiole ·05-·2 in. long. *Bracts* membranous. *Calyx* teeth subulate, as long as the tube. *Corolla* ·5 in. *Nutlets* ·16 in., oblong.

ASSAM (Mann's No. 96).
Fr. 4.

5. Gomphostemma parviflorum *Wall.*

A stout undershrub 5-6 ft. high, often gregarious. *Leaves* 4-14 by 1·5-4·5 in., broad, oblanceolate, elliptic or elliptic-lanceolate, acute or acuminate, dentate, coriaceous, stellately pubescent above, tomentose beneath; lateral nerves 6-9 on either half; base narrowed into the stout petiole ·5-2 in. long. *Cymes* pubescent, fascicled, peduncled, crowded towards the ends of branchlets. *Calyx* pubescent; teeth subulate. *Corolla* 1 in., almost glabrous; tube slender. *Nutlets* ellipsoid or globose.

K. & J. HILLS, SYLHET, KAMRUP, GOALPARA.
Flrs. 8-9. Fr. 10-12.

Var. typica and Var farinosa *Prain*, are both recorded from the region of the flora.

6. Gomphostemma Thomsoni *Benth.*

A hoary woody shrub about 8 ft. high, very variable. *Leaves* 5-10 by 2-4 in., oblong or broadly oblong, ovate, acute, crenulate, subcoriaceous, pubescent above, tomentose beneath; lateral nerves about 10 on either half; base cuneate;

petiole 1·5-4 in. long. *Calyx* ·5 in., tube narrow, teeth subulate. *Corolla* yellow, glabrous. *Nutlets* rugose, oblong, ·25 in long.

K. & J HILLS.

Flrs. 6-7 Fr. 8-9.

G. melissæfolium *Wall.*, G. velutinum *Benth.* and G. Mastersii *Benth.*, are slender perennials which are also recorded from the region of the flora.

27. LEUCOSCEPTRUM Smith.

Leucosceptrum canum *Sm.* Vern. *Tiu-toti-tip*, Khasi; *Dieng-lakchhi*, Synt.

A small tree (30 ft.); branches, inflorescence, under-surface of leaves and petiole densely clothed with hairs or pale brown tomentum; bark grey, thin, smooth; inside green. *Leaves* 2·5-9 by 1-4 in., elliptic, elliptic-lanceolate, acuminate, crenate-serrate or entire, coriaceous, glabrous above when mature; lateral nerves 10-13 on either half, sub-parallel; base cuneate; petiole ·5-1·5 in. long. *Flowers* white or pinkish, in dense cylindrical spikes, 4-6 in. long; bracts transversely oblong, sub-reniform, glabrous above, tomentose beneath; pedicels short. *Calyx* hairy without. *Corolla* slightly exceeding the calyx. *Stamens* 1 in. long, pinkish; anthers reniform. *Nutlets* triquetrous.

KHASI HILLS.

Flrs. 6-11. Fr. Cold season.

28. TEUCRIUM Linn.

Teucrium quadrifarium *Buch-Ham.*

A tomentose or villous shrubby perennial. *Leaves* ·5-3 by ·3-1·2 in., ovate, oblong-ovate, cordate, crenate, sub-coriaceous, hairy; petiole ·05-·3 in. long. *Flowers* shortly pedicelled, in terminal spiciform racemes; bracts large, ovate-acuminate, shortly stalked, pinkish near the base. *Calyx* 2-lipped, 10-ribbed; teeth 5, the uppermost ·16-·2 in. deep. *Corolla* tube not annulate, hardly exceeding the calyx. *Stamens* 4,

didynamous, exserted; anthers reniform, confluent. *Disc* symmetrical. *Nutlets* minute.

KHASI HILLS (5000 ft.).

Flrs. 8.

T. viscidum *Bl.* Syn. T. stoloniferum Roxb.

An erect pubescent herb. *Leaves* 1·3 by ·6-2 in., ovate, crenate; petiole upto 1 in. long. *Corolla* tinged purple is also recorded from KHASI HILLS, 500 ft.

Flrs. 6.

FAM. 102. PLANTAGINACEÆ.

Scapigerous herbs annual or perennial, glabrous or hairy. *Leaves* usually radical. *Scapes* axillary. *Flowers* small, greenish, spicate, often dimorphic. *Calyx*-segments 4, imbricate in bud, persistent. *Corolla* hypogynous, salver-shaped, scarious; lobes 4, imbricate in bud. *Stamens* 4, inserted on the corolla tube; filaments capillary, inflexed in bud, persistent; anthers large, pendulous, versatile. *Ovary* superior, 1-4-celled; style filiform with 2 lines of stigmatic hairs; ovules 1-8 in each cell. *Capsule* membranous, 1-4-celled, dehiscing circumscissley. *Seeds* usually peltate (attached by the centre); testa thin, mucilaginous; albumen fleshy; embryo cylindric, transverse; radicle inferior.

PLANTAGO Linn.

Plantago erosa *Wall.* Syn. P. major Linn. (in part).

An almost glabrous perennial; root-stock erect, stout, truncate. *Leaves* alternate, 1-4 by ·3-1 in., ovate-oblong or oblong-ovate, sub-acute or obtuse, entire or sinuate toothed, sub-coriaceous, puberulous when young, almost glabrous when mature, 3-7 nerved (commonly 5); base decurrent into the sheathing petiole upto 4 in. long. *Flowering* spikes slender, 2-6 in. long. *Corolla* lobes glabrous. *Cells* of capsule 4-8-seeded. *Seeds* angled, minute, blackish, rugose.

KHASI HILLS, (upto 5,000 ft)

Leaves are applied to bruises and the seeds are used medicinally as a substitute for Isphagul (*Plantago ovata* forsk). Leaves and roots are used as a valuable astringent and febrifuge.

Flrs. 4-7.

ADDENDA.

Materials for the following species were obtained after the original manuscript had been sent to the press and in consequence their concise descriptions are given below. In some instances the names of the species are only mentioned

Viburnum punctatum *Ham ex. Don.*

A stout evergreen shrub, glabrous. *Leaves* 4-8 by 1·5-3 in., coriaceous, elliptic-acuminate, almost entire, shining, clothed with orbicular multi-cellular microscopic peltate scales beneath; base narrowed into the petiole; petiole about ·4-·8 in. long. *Flowers* ·2 in. across, whitish, in compound terminal umbels. *Calyx* teeth minute, obtuse. *Corolla* lobes about ·1 in., round. *Anther* exserted. *Drupe* about ·3-·35 in. long; seeds 5-grooved with 3 grooves on the ventral and 2 on the dorsal.

ASSAM.

Flrs. 8-10 (or earlier) Fr. Cold season.

(No specimen in Forest Herbarium, Shillong. The record of this species in Assam is mentioned by Mr D. Chatterjee, M.Sc., Royal Botanic Garden, Edinburgh).

Geophila reniformis *D. Don.*

A slender perennial. *Leaves* ·75-1·5 in., orbicular, deeply cordate, more or less pubescent; petiole 1-3 in. long. *Flowers* in 1-3 flowered pedunculate umbels. *Calyx* segments 5-7, slender, herbaceous, persistent. *Corolla* lobes 4-7, valvate. *Stamens* 4-7. *Ovary* 2-celled. *Drupe* small, globose, purplish.

SYLHET, K. & J. HILLS.
(*F.B.I.*, III, p. 178. No specimens in Forest Herbarium, Shillong).

Petunga racemosa *K. Sch.*=P. Roxburghii *DC.*

An evergreen shrub. *Leaves* 2·5 by ·7-1·5 in., thinly coriaceous; stipules deciduous; petals ·25 in. long. *Flowers*

in axillary spikes. *Calyx* tube ovoid, 4-toothed. *Corolla* infundibuliform; throat villous; lobes 4. *Stamens* 4. *Berry* globose, orange yellow, 2-celled.

SYLHET (Wallich)

(*F.B I.*, III, p. 120. No specimens in Forest Herbarium, Shillong).

Knoxia exaltata *Griff.* KHASI HILLS.

Pavetta assamica *Br.*, P. neglecta *Bom.* (Lushai Hills), P. polyantha *Bom.* (P. indica Linn. var. polyantha Wall) (Sylhet) are recorded from the region of this flora (Monograph of the genus Pavetta Fedde. Report XXXVII, 1934, p. 119.

Coffea semiserrata *Colebr ex Wall.* is recorded from Assam.

Psychotria sphærocarpa *Wall.*

A glabrous shrubby plant.

SYLHET (Wallich)

(*F B.I.*, Vol. III, p. 176. No specimen in Forest Herbarium, Shillong).

Saprosma consimile *Kurz.*

A glabrous fœtid shrub. *Leaves* 3-5 by ·5-1·5 in., elliptic or lanceolate, caudate or acuminate, membranous; petiole about ·2 in. *Flowers* solitary or few. *Calyx* teeth lanceolate; tube funnel-shaped. *Corolla* white, about ·25 in. long. *Fruit* broadly ovoid, smooth and seed usually solitary, *Kurz.*

KHASI HILLS, (De Silva) upto 5,000 ft.

(*F.B.I.*, Vol. III, p. 192. No specimen in Forest Herbarium, Shillong).

Borreria stricta *K. Sch.* is also recorded from Assam. (D. Chatterjee, R. B. G., Edinburgh).

Valeriana assamensis *Gandog.* is also recorded from Assam. (D. Chatterjee, R.B.G., Edinburgh).

Ixeris polycephala *Cass.*=Lactuca polycephala Benth.

A glabrous slender annual; stem herbaceous, ribbed. *Leaves* (cauline) sessile, (radical) petiolate, narrow or linear-lanceolate. *Heads* many flowered in dichotomous or sub-umbellate corymbs or panicles. *Achenes* elliptic-lanceolate, ribbed. *Pappus* silvery.

KHASI HILLS, GOALPARA.
Flrs. & Fr. Cold season.

Lactuca hastata *DC.*

A tall and robust species. *Leaves* 1-2 by ·5-·7 in. (Assam herbarium sheet) usually hastate, sharply denticulate, acuminate, hispid or pubescent. *Heads* sub-campanulate, many flowered. *Achene* obovate and elliptic.

KHASI HILLS, Nongpoh (2,500-3,000 ft.).
Flrs. 10. Fr. Cold season.

Agapetes burmanica *W. E. Evans.*

A big straggling shrub with long loose branches, forming confused tanglements on a precipitous wooded cliff, rarely more or less erect. Not epiphytic. *Flowers* pendent, singly or in bunches from the old wood. *Corolla* 2·2·5 in. long, bright rose-crimson.

Delei Valley, (900-1,200 ft.). Kingdon Ward (8124).
Allied to A. grandiflora *Hk. f.*
Flrs. 4.

A. Parishii *Clarke.*

"Appears to be closely allied to A. setigera and A. variegata which differs principally in the apically curved corolla and fascicled inflorescence respectively."

CACHAR, "Shapone-Kookee-poonjee," 19th March, 1873.

A. linearifolia *Clarke.*

An epiphytic shrub. *Racemes* axillary, corymbose, pedunculate; peduncles glabrous. *Calyx* short, somewhat cylindric. *Corolla* almost cylindric, green; style-filiform.

Mishmi Hills, Delei Valley, Kingdon Ward (8021). 'Corolla green; pedicel, calyx and ovary scarlet.'

Flrs. 4.

A. spissa *Airy-Shaw.*

A large epiphytic shrub. *Leaves* obovate. *Flowers* solitary, axillary. *Calyx* segments somewhat connate. *Corolla* white, sub-cylindric, somewhat narrowtd at the apex, 5-angulate. *Filaments* narrowly linear. *Style* filiform.

Delei Valley (2500-1800 m) Kingdon Ward (8479). "Flowers white; calyx, corolla and filaments pubescent or downy."

Flrs. 7.

(Kew Bulletin, 1935 II studies in the *Ericales* H. K. Airy-Shaw).

A. hyalocheilos *Airy-Shaw.*

An epiphytic shrub allied to A. Griffithii *Clarke*, but leaves are smaller, lanceolate, sub-sessile; base rotundate. *Peduncles* shorter. *Calyx* segments subulate. *Corolla* narrowly infundibuliform.

Daphala Hills.

A. Forrestii *W. E. Evans.*

"Epiphytic in the mixed forest, common on the ridge. Usually hanging down in long loose branches. *Flowers* scarlet, the points of the corolla green."

Delei Valley, (Kingdon Ward, 8061).

Rhododendron assamicus *Ward.*, R. bulu *Hutch.*, R. pankimense *Cowan ex Ward* (Mishmi Hills), R. patulum *Ward* and R. kasoense *Hutch.* are recorded from the region of this flora. (D. Chatterjee, R.B.G., Edinburgh).

Monotropa uniflora *Linn.*

A glabrous herb. *Scales* ·75 in., ovate-lanceolate. *Flowers* nodding, one-flowered. *Calyx* lobes 4, resembling scales. *Corolla lobes* 5-6, ultimately deciduous, hardly

saccate at base. *Stamens* 10-12. *Ovary* 5-celled. *Capsule* globose, 5-celled, 5-valved.

KHASI HILLS—upto 6,000 ft.

Flrs. 10. Fr. Cold Season.

Primula khasiana *Balf ex Smith.* is also recorded from Khasi Hills.

Omphalogramma forrestii *Balf. f.* (distinct from Primula).

A single flowered ebracteate scapigerous herb. *Flowers* irregular, non-heteromorphic. *Corolla* 6-partite. *Seeds* peculiar.

ASSAM. (Kew Bulletin, 1934).

Androsace Gangnepainiana *Haud-Mez.*

A herb, rhizomate. *Leaves* rosulate, orbiculate, deeply cordate, 3-8 flowered, divaricate; bracts lanceolate, pilose; pedicels ·2-·6 in. long, strigillose. *Calyx* ·12-·17 in. long, campanulately infunlibuliform; segments ovate-lanceolate. *Corolla* white or rosy, ·25 in. across; tube ·05 in. long; lobes somewhat obcordate. *Anthers* oblong; filaments short, thick, ·02 in. long. *Capsule* globose (immature).

A. sxifragæfolia *Bunge.*

A glandular pubescent annual is also recorded from Assam (D. Chatterjee).

Lysimachia lobelioides *Wall.*

A small glabrous annual with white or pale purplish flower is also recorded from Assam (D. Chatterjee).

Ardisia Keenani *Clarke.*

A small shrub; branches densely rusty-villous. *Leaves* 7 by 2 in., oblong; petiole ·25 in. long. *Flowers* lax in

pedunculate elongated racemes. *Calyx* segments round, short glabrous.

CACHAR, MANIPUR.
(*F.B.I.* Vol. III, p. 526. No specimen in Forest Herbarium, Shillong).

A. Helferiana *Kurz.*

A small shrub; branches rusty-woolly. *Leaves* 6 by 2 in., obovate-oblong. *Flowers* in axillary pedunculate sub-umbellate racemes. *Calyx* segments ovate, densely villous.

Also recorded from ASSAM
(*F.B.I.* Vol. III, p. 526).

A. rhynchophylla *Clarke.*

A small shrub. *Leaves* 4·5 by 1·2 in., obovate-lanceolate, caudate-acuminate. *Flowers* white, large in shortly pedunculate few flowered racemes. *Calyx* segments elliptic, concave. *Berry* globose, smooth.

KHASI HILLS, (3-4,000 ft.).
(*F B I.* Vol. III, p. 529).

Mæsa populifolia *Mez* and M. Kurzii *Mez.* are also recorded from Assam.

Genianthus crassifolius *Hk. f.*

A twining shrub; young parts rusty-tomentose. *Leaves* 3-5 by 2-2·5 in., elliptic, acute or acuminate; margins recurved, coriaceous; midrib tomentose beneath; base rounded or acute. *Flowers* small in axillary dichotomously branched cymes. *Calyx* 5-partite, minutely glandular within. *Corolla* lobes 5; coronal scales over-topping the anther cells. *Stamens* 5. *Pollen* masses 2 in each cell, waxy. *Carpels* 2; stigma sub-clavate, sessile. *Fruit* of 2 slender follicles. *Seeds* comose.

SYLHET (Wallich).
(No specimen in Forest Herbarium, Shillong).

Dischidia Micholitzii *Brown*-is also recorded from Assam.

Mitrasacme alsinoides *Br.*

A slender branched almost glabrous annual. *Leaves* small, about ·2 to ·3 in. long, scaberulous. *Flowers* white, axillary, solitary, about ·1 in. across; pedicels slender. *Calyx* ·08 in. *Corolla* throat hairy. *Capsule* ·08 in.

ASSAM. (*F.B.I.* Vol. IV, p. 80).

Flrs. Rainy Season. Fr. 10-11.

Strychnos axillaris *Colebr.*

A glabrous shrub with tendril. *Leaves* 2·5 by 1 in., elliptic-acuminate; base obtuse; 3-nerved; petiole ·12-·2 in. *Flowers* in small subcapitate sessile, pubescent cymes. *Corolla* villous within. *Anther* cells sparsely hairy. *Ovary* glabrous.

KHASI HILLS, upto 4,000 ft. (Wallich, Griff.).

(No specimen in Forest Herbarium, Shillong). (*F.B.I* Vol. IV, p. 89).

S. cinnamomifolia *Thw.*

A climbing shrub with tendril. *Leaves* 4 by 2 in., elliptic, acute, glabrous; base obtuse, 3-5 nerved; petiole about ·2 in. *Flowers* in pedunculate puberulous cymes. *Corolla* glabrous. *Anther* cells glabrous. (resembles S. Nux-vomica).

ASSAM.

(Mr. D. Chatterjee, R. B. G., Edinburgh, mentions this Assam record. No specimen in Forest Herbarium, Shillong). (*F.B.I.* Vol. IV, p. 89).

Fagræa Prainii *Gandoger* is also recorded from Assam.

Cuscuta chinensis *Lamk.*

A leafless twining parasite. *Flowers* in dense cymes or racemes. *Calyx* segments triangular, ovate. *Corolla* lobes obtuse or bluntly acute; scales shortly fimbriate. *Ovary* obtuse; style 2, elongate; stigma capitate; fruit obtuse when young.

(*F.B.I.* Vol. IV, p. 226. No specimens in Forest Herbarium, Shillong).

(The record of this species in Assam is mentioned by Mr. D. Chatterjee, Royal Botanic Garden, Edinburgh).

Browallia demessa *Linn.*

Rather shrubby. *Leaves* 1·5-2·5 by ·9-1·4 in., ovate, entire, sub-acute, membranous, sparely hairy; lateral nerves slender, often arching; base rounded or cuneate; petiole ·5-1·2 in. long. *Flowers* solitary, extra axillary or in cluster of 2-3 flowers (terminal). *Calyx* hairy; segments 5. *Corolla* bluish, ·8 in. long; tube slender, ·4-·5 in. long. *Fruits* baccate, ·3 in. long (persistent calyx); seeds small, black.

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

Flrs. & Fr. 9.

Limnophila conferta *Benth.*

A variable plant. *Leaves* 1 by ·2 in., opposite, sessile or very shortly petioled, oblong or elliptic-oblong, obtuse, crenate-serrate, pubescent beneath; base narrowed or sub-amplexicaul. *Inflorescence* various, hairy (*flowers* solitary in Assam specimen). *Calyx* segments lanceolate, glabrate, acuminate.

AKA HILLS.

Flrs. 8.

Vandellia hirsuta *Benth.*

An erect succulent herb. *Leaves* 1-2 in. long, ovate or oblong-obtuse, entire or sinuate, sessile (lower petioled). *Flowers* in many flowered racemes. *Calyx* segments lanceolate. *Capsule* orbicular.

AKA HILLS.

Flrs. 8

Verbascum Thapsus *Linn.*

A woolly herb, rather woody. *Leaves* alternate, 2-3 by ·5-·7 in. (Aka hills specimen), oblanceolate, decurrent, entire or crenate. *Flowers* in simple densely woolly spike.

Calyx segments 5. *Corolla* rotate; lobes 5. *Stamens* 5, fertile; 2 glabrous, 3 hairy. *Capsule* septicidal; seeds winged.

AKA HILLS.

Flrs. 9.

Thunbergia alata *Boj.*

A scandent shrub, softly villous. *Leaves* ovate-cordate; petiole of the winged upto ·9 in. long. *Corolla* orange-yellow.

Native of AFRICA. Cultivated and naturalised in ASSAM. AKA HILLS. (*F.B.I.* Vol. IV. p. 391).

Flrs. 8.

Strobilanthes Wallichii *Nees.*

Shrubby; branches slender, quadrangular. *Leaves* 3 by 1 in., (1 by ·5 in., Aka Hills), elliptic, acuminate, crenate-serrate, almost glabrous; lateral nerves about 6 on either half; petiole about ·7 in. (upper lines almost sessile-cordate). *Flowers* solitary (Aka Hills). *Calyx* segments much elongated in fruit (about 1 in.). *Corolla* blue, about 1·4 in., almost straight. *Capsule* 4-seeded, glabrous, ·5-·6 in. long; seeds pubescent.

AKA HILLS.

Flrs. 8-9.

Justicia quinqueangularis *Kœn.*

An erect shrub or ascending from a geniculate base; stem rigid, often 5-sided. *Leaves* in distant pairs, 1-1·5 by ·1 in., linear, subacute or sub-obtuse, glabrous, obscurely lineolate above. *Flowers* in terminal lax spikes; bracts linear, glabrous. *Calyx* segments linear-oblong, elongated in fruit (upto ·3 in.), somewhat herbaceous. *Capsule* ·2-·3 in., stout.

AKA HILLS.

Flrs. 8-9.

Hypoestes triflora *Roem & Sch.*

Rather herbaceous. *Leaves* 2-2·5 by 1-1·5 in., ovate, crenate, or denticulate, sparsely hairy above, pubescent

beneath; petiole 1-1·2 in. long. *Flowers* in axillary or terminal capitellate clusters; bracts obovate. *Calyx* ·12 in. *Corolla* pink or white, about ·4 in. *Capsule* ·3 in., almost globose,

AKA HILLS.
Flrs. 8-9.

Acrocephalus verbenæfolius *Wall Mss. Descript. Mukerjee.*

An erect herb; branches glandulose, sulcate, somewhat scabrid. *Leaves* sessile or subsessile, 1·2-3·2 by ·1-·2 in., linear or narrowly lanceolate, acute or sometimes acuminate, dentate, somewhat strigose on both surfaces; base norrowed. *Flowers* in terminal spike, densely villous. *Calyx* ·1 in. long, campanulate, densely villous outside. *Corolla* white or pale yellow; tube slender; superior lip subequal, 4-lobed; inferior lip entire. *Filaments* anterior ·06 in. long; posterior ·05 in. long. *Style* ·1 in. long. *Nutlets* brown, very small, ovoid, minutely tubercled.

ASSAM, MANIPUR (G. Watt—Meebold) CACHAR (Prasei).
(Notes, Royal Botanic Garden, Edinburgh, No. XCV July 1938).

Scutellaria assamica *Mukerjee.*

An erect slender herb, sparsely pilose or glabrescent. *Leaves* 1·2-2·5 by ·4-1·2 in., narrowly ovate, acuminate or sometimes acute, serrate, sparsely pilose on both sides more so on the nerves beneath; base rotundate; petiole slender, ·2-·4 in. long, rarely 1·2 in. long. *Flowers* few, in terminal lax; racemes; bracts lanceolate, entire, ciliate. *Calyx* ·1-·2 in. long, densely pubescent. *Corolla* about 1 in. long, minutely pilose or glabrescent, purplish white; tube erect, gradually inflated; lobes short. *Filaments* glabrous. *Nutlets* ·05 in. across, black, tubercled.

ASSAM, upto 7,000 ft. Kohima—NAGA HILLS; MANIPUR; LUSHAI HILLS.
(Notes, Royal Botanic Garden, Edinburgh, No. XCV July 1938)

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OF

VERNACULAR, SANSKRIT AND ENGLISH NAMES

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

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