Habitat.—Tropical India in the drier districts, from the Panjab and Chota Nagpore to Ceylon, common (absent in Bengal proper and humid Malabar).

An erect annual, 6-18in. high. Stem 4-angled grooved, clothed with spreading hairs, sometimes branched. Leaves 1-3in. long, sessile oblong or subelliptic, obtuse, sparsely hairy, base cuneate, margins ciliate, main lateral nerves 4-6 pairs. Flowers unilateral, in axillary spreading or recurved racemes shorter than the leaves, rhachis gland.-hairy; bracts $\frac{1}{12}$in. long, lanceolate, bracteoles much smaller. Calyx $\frac{1}{6}$-$\frac{1}{4}$in.; segments narrowly linear, acute, ciliate, elongating in fruit. Corolla about $\frac{1}{2}$ in. long, densely hairy outside, pink or white, the lower lip spotted with purple. Filaments slightly hairy, anthers bearded. Capsule $\frac{1}{3}$-$\frac{1}{2}$ in. long, elliptic-lanceolate, hairy. Seeds $\frac{1}{10}$in. long, rugose, glabrous.

Use:—The juice is given in fever (Rheede).

---

928. *Haplanthus verticillaris, Necs.*, H.F.B.I., IV. 506.

Syn.:—Justicia Verticillata, *Roxb.* 45.

Vern.:—Kastula (H.); Jhankara (Marathi); Kálá Kiráyat; Kálayakara (Western India).

Habitat:—W. Deccan Peninsula, frequent, extending north to Mt. Aboo. Bundelkhand, Assam.

A herb, 1½-2½ ft.high. Stems glabrous at the base, more or less pubescent upwards. Leaves 2½-4 in. long, ovate, acuminate acute or subobtuse, hairy on the upper surface and on the nerves beneath, abruptly cuneate at the base; main nerves 8-10 pairs, prominent beneath, petioles 1-2in. long. Cladodes (axillary spines) 1-1½ in. long, stout, 4-angled, enlarging in fruit, usually with 2 sharp spines at the apex, more or less glandular-pubescent and with spreading bristles towards the base. Flowers sessile amongst the verticils of cladodes; bracteoles longer than the calyx, subulate, finely pointed. Calyx $\frac{1}{6}$in. long, segments lanceolate, pointed, gland.-pubescent. Corolla $\frac{2}{3}$ in. long, minutely hairy outside, limb lilac, with darker lines. Capsule about $\frac{1}{2}$in.

long, narrowly oblong acute, glabrous. Seeds $\frac{1}{10}$-$\frac{1}{8}$in. long (Duthie).

929. *H. tentaculatus, Nees.* H.F.B.I., IV. 507.

Vern. :—The same as of the last.

Habitat :—Bombay ; Belgaum ; Malabar ; Central India.

A slender gland.-pubescent herb. Stems 4-angular above. Leaves 2-4in. long, ovate, acuminate, decurrent into the petioles ; main nerves 8-10 pairs, petioles often obscure. Cladodes slender, $\frac{1}{4}$-$\frac{3}{4}$in. long, densely clothed, with short hairs intermixed with longer ones, the apex furnished with 2 or 3 flattened villous teeth (reduced leaves). Flowers sessile amongst the cladodes ; bracteoles subulate, shorter than the calyx. Calyx $\frac{1}{6}$in. long ; segments linear-subulate, hairy. Corolla about $\frac{1}{2}$in. long, blue lilac or white. Capsule $\frac{1}{3}$in. long, oblong, pointed, hairy. Seeds smaller than those of H. *verticillaris.*

Mr. Nairne, in his ' Flowering Plants of Western India ' says of this plant, that it is " a smaller species than the last, very like it, but with short petioled oval leaves, rounded at both ends, a little hairy."

Uses :—The authors of the *Pharmacographia Indica* (Vol. III p. 47) say that the above-mentioned two plants " are used medicinally." They are given in fever.

930. *Gymnostachyum febrifugum, Benth.* H.F.B.I. IV. 508.

Vern. :—Nelamuchchala (Kan.).

Habitat :—S. Deccan Peninsula ; Mangalore.

Nearly stemless. Leaves $6\frac{1}{2}$ by 3in., decurrent on the petiole, subentire or undulate-crenulate, above lineolate nearly glabrous or minutely sparsely setulose, beneath paler glabrous or pubescent on the nerves. Panicles puberulous, 6-12in., in appearance radical ; flowers opposite, solitary or in very small few-fid. cymes ; bracts small, narrow ; bracteoles 0. Sepals $\frac{1}{8}$-$\frac{1}{6}$in., glabrous or puberulous. Corolla $1\frac{1}{4}$in., upper half inflated, glabrous. Anthers ovate, hairy, capsule 1in.

Use :—A decoction of the root is a febrifuge.

The root contains a bitter principle of a resinoid nature dissolving in sulphuric acid, with a purple colour. It contains, besides, a crystalline cholesterol, with small quantities of tannin and sugar (Hooper).

---

931. *Phlogacanthus thyrsiflorus, Nees.* H.F.B.I. IV. 512.

Vern.:—Lalbâhuk (Pb.).

Habitat:—Subtropical Himalaya, from Garhwal to Bhotan, very common. Khasia hills and Assam.

A shrub 3-7ft. Leaves large, lanceolate, glabrous, 7 by $1\frac{3}{4}$in., tapering at both ends, subentire, densely punctulate; petiole $\frac{3}{4}$in. Thyrses 4-12in., terminal, solitary or several, or quasi-axillary on lateral branches; peduncles short; bracts $\frac{1}{4}$in., linear. Calyxtube $\frac{1}{8}$in.; teeth $\frac{1}{4}$-$\frac{1}{3}$in., setaceous, densely pubescent. Corolla $\frac{2}{3}$ in., closely villous, orange; tube broad from the base, curved; 2-lipped, upper lip suberect, lower patent. Stamens glabrous, or slightly hairy near the base of the filaments; 2 rudiments often discernible. Style glabrous. Capsule $1\frac{1}{4}$ by $\frac{1}{6}$in., subquadrangular, glabrous, 12-14-seeded. Seeds much compressed, orbicular in outline, densely shortly hairy, hairs elastically spreading when moistened.

Use:—In the Panjab, it is put to the same uses as Adhatoda Vasica, *Nees.*

---

932. *Lepidagathis cristata, Willd.* H.F.B.I. IV. 516; Roxb. 476.

Vern.:—Bhuyaterada (M.); Ot dhompo (Santal).

Habitat:—Frequent in Coromandel.

Herbs, with perennial rootstock. Stems 6-18in., branched, procumbent, quadrangular, puberulous or slightly pubescent. Leaves 1 by $\frac{1}{4}$in., sessile lanceolate above, minutely scabrid pubescent on the nerves beneath or glabrate; linear or oblong. Inflorescence subradical globose; one or two small heads sometimes added to the lower part of the leafy branches. Bracts $\frac{1}{3}$ in.,rigid in fruit. Bracteoles membranous, hairy, spinescent. Both bracts and bracteoles elliptic ovate or obovate, suddenly spinose acuminate. Calyx sub-4-partite, one segment bifid;

sepals elliptic or obovate, suddenly spinulose and densely hairy in fruit ; thickened, very hairy upwards, with a mucro. Corolla ⅛in., densely hairy in bud, white, with brown or purple spots in the palate. Stamens glabrous, anther-cells one slightly above the other, papillose, ciliate. Ovary glabrous. Capsule ¼in., 2-seeded, elongate conic, dorsally scarious, thin, irregularly tearing, only ultimately 2-valved from the subsolid tip. Seeds ovate-lanceolate, with very long hair, spreading elastically when wet, very mucilaginous (C.B. Clarke).

Uses :—A bitter herb used in fevers (Sakharam Arjun). The ash of the dry plant is employed in Chutia Nagpur as an application to sores (Revd. A. Campbell). It is applied to cure itchy affections of the skin (Dymock).

---

933. *Justicia Gendarussa, Linn. f.* II.F.B.I., IV. 532, Roxb. 43.

Syn. :—Gendarussa vulgaris, *Nees.*

Sans. :—Nil-nirgandi.

Vern. :—Udí-sanbhálú, nílí-nargandí (Hind.) ; Jagat-madan, jognodon (Beng.) ; Teo, kala-adulsa (Bomb.) ; Kalíshanbálí (Dec.) ; Karu-noch-chi, karuppu-noch-chi (Tam.) ; Néla-vávili, nalla-noch-chi, nalla-vávili (Tel.) ; Karelakkí-gidá (Kan.) ; Karun-noch-chi, váták-koti, vátan-golli (Mal.)

Habitat :—Throughout India, from Bengal to Ceylon.

A perennial, much branched, undershrub. Stems 2-4ft., erect, quadrangular, thickened above the nodes, glabrous, purple. Leaves 4 by ¾in., sometimes 5in. long, linear lanceolate, acute at base, tapering to obtuse apex, entire or slightly and irregularly crenate, glabrous and shining, rather thick, veins prominent beneath, purple. Petiole ¼in. Flowers rather small, white or pink, with minute red dots in the throat and lip, in opposite clusters of three short interrupted sessile terminal spikes, lower clusters usually distant. Bracts ¼in., linear, acute. Bracteoles O. Sepals ⅛in., linear, subulate, glabrous. Corolla nearly glabrous ; tube ⅜in., upper lip notched, lower lip transversly rugose. Fruit not seen, says Triman, from Ceylon. "Lower anther-cell distinctly tailed. Capsule ½in., clavate, glabrous, 4-seeded" (C.B. Clarke).

Commonly used in Bombay as a garden fringe-plant. The leaves have a pleasant taste, says Triman. It is questionable if they are so; for on chewing them I find them distinctly possessed of a disagreeable oily taste (K.R. Kirtikar).

Uses:—The Malays employ it as a febrifuge (Motley, in *Hooker's Journ. of Bot.*, 1855, vol. vii. p. 166). According to Horsfield (*Asiat Journ.*, vol. vii. p. 266), emetic qualities are ascribed to it in Java. The leaves and tender shoots, which, when bruised, emit a strong but not unpleasant odour, are, according to Ainslie (*Mat. Ind.* vol., ii. p. 68), prescribed in decoction in chronic rheumatism. Its action is apparently that of a diaphoretic. Our knowledge of its virtues rests principally on native testimony (Ph. Ind.).

An oil prepared from the leaves when applied locally is said to be useful in eczema, and an infusion of the leaves is given internally in cephalalgia, hemiplegia, and facial paralysis (Surg.-Major Houstan, in Watt's Dictionary).

The juice of the fresh leaves is dropped into the ear for ear-ache, and into the corresponding nostril on the side of the head affected with hemicrania (P. Kinsley, in Watt's Dictionary).

934. *J. procumbens*, *Linn.*, H.F.B.I., IV. 539. Roxb. 45.

Vern.:—Ghâti-pitpáprá, pitpápada (Bomb.)

Habitat:—South Western India, extending as far north as the South Konkan.

Stems diffuse, slender, with many divaricate branches, rooting at lower nodes, furrowed, nearly glabrous, with a few long hairs below the nodes, or with spreading hair. Leaves ¾-1½in., oval or ovate-oval, obtuse at both ends, entire or slightly crenate, softly hairy-pubescent on both sides; elliptic or lanceolate, says C. B. Clarke. Flowers very small, in rather dense cylindric terminal spikes; ½-1½in. long. Bractlets linear, long, ciliate. Sepals linear-filiform, strongly ciliate, as long as bractlets, one shorter or absent. Lower lip of Corolla broader than long, lobes shallow, obtuse. Capsule ⅛in., with a short, solid base. Flowers pale, violet, pink, the lower lip spotted with darker pink. The flowers vary in size, being larger than the hill forms.

Uses:—Used as a substitute for true *Pit-pápra* (Fumaria), which it resembles in having a faintly bitter, disagreeable taste (Dymock). The juice of the leaves is squeezed into the eye in cases of ophthalmia (Ainslie).

935. *Ádhatoda Vasica, Nees*, H.F.B.I., IV. 540.

Syn.:—Justicia Adhatoda, *Linn.*, Roxb. 43.

Habitat:—From the Punjab and Assam to Ceylon and Singapore.

Sans.:—Arusak (not angry), Vâsa (giving perfume), Vrisha (chief), Sinha-mukhi (lion-mouthed), Sinha-parni (lion-leaved), Sinhakatpat (lion-eradicator), Ruksha (dry.)

Vern.:—Arusha, adulasá, adulaso (Hind. and Bom.); Bâkas, vásaka (Beng.); Bhekkar, basúti, tora Lujja, bashang arús, (Himalayan names); Bansa (Pers.); Adhadode (Tam.); Adasara (Tel.); Atalotakam (Mad.)

An evergreen, dense shrub, 4-8ft., sometimes arborescent, even 20ft., with a fetid smell, says Kanjilal. The Bombay plant has no fetid smell. Leaves 4-8in., entire, minutely pubescent especially when young, lateral nerves 8-12 pair. Petiole 1-1½in. Inflorescence a dense, short, pedunculate, bracteate spike, 2-4in. long, terminal often several together. Bracts ¾ by ¼in., ovate or elliptic sessile; bracteoles ½ by ⅛in., falcate, oblong. Calyx ⅓-½in. deeply 5-lobed, lobes equal, lanceolate. Corolla-tube ⅛-½ by ½-⅓in. broad, white, lower portion short and funnel-shaped; lower lip with two lines of oblique purple bars. Stamens 2; filaments dilated; anther-cells acute at the apex, scarcely spurred at base. Capsule ¾in. clavate, longitudinally channelled, pubescent, 4-seeded. Seeds ⅕in. diam., glabrous, tubercled. Wood white, moderately hard. Every part of the plant is exceedingly bitter.

Uses:—The leaves and the root of this plant are considered a very efficacious remedy for all sorts of coughs, being administered along with ginger. "The medicine was considered so serviceable in phthisis that it was said no man suffering from this disease need despair as long as the *vasaka* plant exists"

(U. C. Dutt.) It is often administered along with honey, the fresh juice or a decoction with pepper being made into a cough mixture. The *Pharm. Indica* states that strong testimony has been given in favor of its remedial properties, drawn from personal experience, in the treatment of chronic bronchitis, asthma, &c., when not attended with febrile action. The flowers and the fruit are bitter, aromatic and antispasmodic. The fresh flowers are bound over the eyes in cases of ophthalmia. "The flowers, leaves, and root, but especially the first, are supposed to possess antispasmodic qualities." "They are bitterish and sub-aromatic and are administered in infusion and electuary as anthelmintic" (Ainslie). The leaves are used as a cattle medicine; in the case of man for rheumatism; and the flowers for ophthalmia (Stewart).

The leaves dried and made into cigarettes are smoked in asthma and their juice is used for diarrhœa and dysentery. The powdered root is used in Mysore by native doctors in cases of malarial fever. It has expectorant and antispasmodic properties, and its use has been recommended in the treatment of colds, coughs, asthma, phthisis, and even diphtheria, in which it deserves more extended trial. It is said, also, to be a valuable antiseptic, antiperiodic, and anthelmintic. Drury mentions that the leaves given in conjunction with those of Solanum trilobatum and S. xanthocarpum are employed by the Vythians internally in decoction as anthelmentic. In Bengal and Upper India also the leaves are smoked as cheroots for asthma. In Assam, the juice of the plant is considered the best preparation. It is extracted from the young shoots and flowers by first washing them in an ordinary brass or iron vessel over a fire and then applying pressure. It is taken with *ghi* or honey. In Central India, the plant is one of the ingredients used for preparing the mixture in which infants up to the age of four months are bathed. The Burmese pound the leaves and use them as a poultice for fresh wounds, while an infusion of the leaves and twigs is given internally for coughs. In the Tenasserim district, the leaves are used externally in cases of swellings, bleeding of the nose, and headache; and internally for fever, colic, asthma and dysentery. It is prescribed in a spirit for wealthy persons suffer-

ing from certain humours. The spirit is prepared with this as a chief ingredient and several other articles, and it is said to strengthen the chest and throat. It has been known to cure bleeding of the lungs by taking a sweetened decoction of the plant, and the preparation is an excellent mixture for children and others with bad coughs and colds.

Dr. Rusby states that "it appears to be toxic to all forms of life, in direct proportion to their lowness in the scale, and that this property is unique among plants. * * The leaves are found to completely destroy the lower aquatics and to prevent their re-appearance. Laid upon fruits and other perishable substances they, to a great extent, prevent mould and decay. They check the development of parasitic diseases on vegetation. The very extended use of this plant in India in the treatment of tuberculosis and other respiratory diseases may be founded upon this property."

"It is probable," writes Dr. Watt, 'we have in *Adhatoda* an antiseptic at the door of every Indian peasant. An aqueous solution of the alcoholic extract of the leaves was tried upon flies, fleas, mosquitoes, centipedes and other insects, and in every case the application met with poisonous results."

There seems to be a wide field of usefulness for this remarkable plant in the treatment of diseases depending upon the presence of fungi, bacteria, etc.

In the Second Report of the Indigenous Drugs Committee, p. 35, we read.—

"In the experiments so far done (see *Pro. Indigenous Drugs Committee*, Vol. I., pages 387-418) Captain Childe, who used 30 minim doses of the tincture, reported that it did well in cases of bronchitis, especially in chronic bronchitis, but no benefit resulted in cases of phthisis. Lieutenant-Colonel Nailer reported that the drug was administered in chronic bronchitis, bronchial asthma and phthisis, and that he would not recommend its use in such cases. Lieutenant-Colonel Lee reported that it was a useful expectorant. Major Crawford reported that the drug was tried in several cases in the form of a tincture; it acted well in the latter in the stages of acute bronthitis. Assistant Surgeon W. D. Innes reported that the drug was used in cases of chronic bronchitis, its action was not definite and not as effective as some of the drugs now in ordinary use. Captain Stewart, who used half drachm in a few cases of bronchitis and pneumonia, reported that it is as effective as ipecacuanha. Major Frenchman, who used the tieture in doses varying from m. xx

to dr. i, reported that in 10 out of 24 cases of chronic and subacute bronchitis and bronchial catarrh, it was found efficacious and successful. It failed in 3 cases of phthisis that he tried. In 2 out of 3 cases of asthma it acted well. The full dose of dr. i causes nausea and griping, and, therefore, had to be reduced to m. xx. which was found sufficient."

The analysis of the leaves reveals certain principles resembling those found in tobacco, as, for instance, an odorous volatile principle, an alkaloid, but not volatile like nicotine, one or more organic acids, sugar, mucilage, and a large percentage of mineral salts.

The chemical analyses have revealed the presence of an alkaloid vasicine as the active principle, and this result has been confirmed by the physiological as well as chemical tests of Dr. Boorsma of Java. A tartrate of vasicine is now an article of commerce on the Continent and future possibilities may be expected of it in medical science.

The various portions of the plant available in the Office of Reporter on Economic Products were analysed by Mr. Hooper, with the following results :

	Moisture.	Ash.	Spt. ext.	Vasicine.
Leaves .	7·9	20 0	13·3	·39
Bark .. .	10·2	14·0	14 4	·35
Root . .	6·7	4 6	3·4	traces.
Root-bark . ..	5·8	12·4	11·2	·58

The alkaloidal content of the bark is here seen to approach very closely to that of the leaves. The question of cost in collecting these two products would have to be considered, and it is evident that the separation of the bark from the stems would entail more labour than the simple method of gathering the leaves from the shrub In other medicinal shrubs, such as Buchu and Senna, when the leaves are officinal, it is not customary to use the bark of the plants in addition to the leaves.

The following results were obtained from quantitative experiments on the powdered barks :-

	From Young Plants		From Old Plants.
Moisture .	12 1	...	10 2
Spirit extract	15	...	16·2
Soluble in water ..	7·2	..	7·5
Resins	7 8	...	8·7
Total Ash	7 0	...	12·2
Sand	2 8	..	7·2
Pure Ash	4·2	..	5·0

It will be seen that the root-bark from the older plants has a higher percentage of acrid and bitter resinous matters than that from the younger plants. In this connection attention should be drawn to the remark made some years ago by Mooden Sheriff of Madras. In the Supplements to the Pharmacopœia of India, page 364, he reports that he found that the older the plant, the more active is the bark in its effects.

936. *Rhinacanthus communis*, *Nees.*, H.F.B.I., IV. 541.

Syn. :—Justicia Nasuta, *Linn.*, Roxb 40

Sans. :—Guthika-parni.

Vern. :—Palik-juhia, pálak-juhi, jui-pani (Hind.); Júi-pana (Beng.); Pulcolli, puzhuk-kolli, pushpa-kedal, nagamallichcheti (Mal. S. P.); Gâchkaran (Bomb.); Gajakarní (Mar.); Kabútar-ka-jhár (Dec.); Naga-malli (Tam.); Nargamollay, nága malle (Tel.); Naga-mallige (Kan.).

Habitat :—Cultivated throughout India; perhaps wild in the Deccan Peninsula.

A much-branched shrub. Leaves entire, 3-4 by $\frac{3}{4}$-$1\frac{1}{2}$in, usually narrowed at both ends, oblong or ovate-oblong, pubescent or glabrate; margins undulate; petiole $\frac{1}{3}$in. Cymes terminal and on short lateral branches, dusky. Flowers often clustered. Bracts and bracteoles 0-$\frac{1}{12}$in, linear. Calyx densely pubescent, $\frac{1}{16}$in. Corolla-tube 1 by $\frac{1}{16}$in., lobes $\frac{1}{3}$in., 3 lower, each twice as broad as the shortly bifid upper. Capsule clavate 4-seeded, stalk long, solid cylindric.

Uses :—The fresh root and leaves, bruised and mixed with lime juice, are a useful remedy for ringworm and other cutaneous affections. The seeds also are efficacious in ringworm. (Ainslie and Royle.) The root-bark is a remedy for the affection of the skin which the Europeans call Dhobie's itch, Malabar itch, &c. (Dymock).

In Sind, it is said to possess extraordinary aphrodisiacal powers, the roots boiled in milk being much employed for that purpose by native practitioners (Murray).

The roots are believed in some parts of India to be an antidote to the bite of poisonous snakes. Of late, it seems to have attracted considerable attention in Europe, on account of its reputed value in the treatment of ringworm. It seems, however, to be universally used with good results in cases of Tinea circinata tropica, although its utility in ordinary ringworm (Tinea tonsurans) seems very doubtful. Dr. Liborius analysed the root at his laboratory at Dorpat, and found that it contained a substance which he called *rhinacanthin*, and which resembled *chrysophanic* and *frangulic* acids in its antiseptic and antiparasitic properties (Watt).

***Chemical composition.*—Liborius has analysed the root in the Dorpat Laboratory, finding in it 13·51 per cent. of ash and 1·87 per cent. of *Rhinacanthin*, a quinine-like body, besides the ordinary constituents of plants.**

Rhinacanthin is a dull cherry-red resinous substance, which contains no nitrogen, and does not reduce copper solution. It seems to be related to chrysophanic and frangulic acids. Two ultimate analyses gave a mean of carbon 67 55 per cent., hydrogen 7·56 per cent. The formula $C_{14}H_{18}O_4$ corresponds with 67·20 C and 7·20 H. Its presence in the plant is said to be limited to certain intercellular spaces occurring in the bark, the cellular tissue of of this part appearing to be filled with an intensely red substance, supposed to consist of a compound of rhinacanthin with an alkali It is obtained by exhaustion of the powdered root fibres with absolute alcohol. Rhinacanthin has the peculiarity of forming with bases beautiful red compounds that are easily decomposed by certain neutral solvents, such as petroleum spirit, which dissolves the rhinacanthin and assumes a yellow colour (*Pharm. Zeitch f. Russl*, Feb 1881; *Year Book Pharm.*, 1881, p. 197.)

---

937. *Eebolium linneanum, Kurz.*, H.F.B I., IV. 544.

Syn —Justicia Eebolium *Linn*, Roxb 38.

Vern —Uda-jati (H), Run-aboli. Dhaktaadulsa (Mar)

Habitat —S Deccan Peninsula

A low shrub, branches erect, cylindrical, thickened above the nodes, glabrous Leaves large, 1½-6in, oblong, oval or lanceolate, tapering to base, acuminate, acute, entire to very faintly crenate, glabrous, shining and dark green above, paler and densely finely pubescent beneath Petiole obscure Flowers large, sessile in opposite pair Spikes nearly sessile, 2-10in., 4-sided Bracts ¾-⅞in, oblong-oval, aristate, glandular-puberul. ciliate, semi membranous, reticulate-veined Bractlets subulate Sepals linear, acuminate, glandular-pubescent Corolla-tube 1¼in, slightly dilated and laterally compressed at throat, deflexed, hairy outside, upper lip about ½in very narrow, strongly reflexed, lower lip about 1½in diam, lateral lobes oblong, acute, middle one oval obtuse. Capsule pubescent Seeds white.

The colour of flowers, is, says Trimen from Ceylon, "pale bluish-green" J. D. Hooker says "greenish-blue or purple."

Use —The roots are prescribed in jaundice and menorrhagia (Dymock).

---

938. *Graptophyllum hortense, Nees.*, H.F.B.I., IV. 545.

Syn..—Justicia picta, *Roxb.* 39.

Vern.·—Pandhara adulsa (variegated variety); Kala adulsa (Dark variety)—(Konkan).

Habitat: -Cultivated in gardens throughout India and Malaya; where wild, uncertain.

A large elegant, ramous shrub, common in gardens, and one of our finest ornaments. I never saw it wild; it is in flower most part of the year. Leaves opposite, short-petioled, ovate-lanceolate, smooth pointed, generally variegated with large white spots, though sometimes of a uniform green, and we have a variety with the leaves uniformly ferruginous. Racemes terminal, short, erect, smooth. Flowers large, generally of a beautiful crimson colour. Bracts opposite; below three or four-flowered; above one-flowered. Corolla throat compressed, divisions of the border soon after they expand becoming spirally revolute, with their inside wrinkled, and beautifully ornamented with small chrystalline specks (Roxburgh).

Uses:—In the Konkan, it is used in the same manner as Adhatoda Vasica, *Nees*. According to Rumphius, the variegated variety is used pounded with the milk of the cocoanut to reduce swelling. Loureirs states that the leaves are emollient and resolvent, and notices their use as a cataplasm to inflamed breasts caused by obstruction to the flow of milk (Dymock).

---

939. *Rungia repens*, *Nees.*, H.F B.I., IV. 519

Syn.:—Justicia repens, *Linn.*, Roxb. 11.

Vern.:—Kodaga saleh (Tam.); Ghátipitpápada (Bomb.)

Habitat:—Common throughout India, from the Punjab and Bengal to Ceylon.

A procumbent herb, rooting, ramous weed, says Clarke. Stems usually decumbent, says Triman, and rooting at the base, thin, erect, slender, cylindric puberulous. Branches quadrangular, pubescent or nearly glabrous. Leaves oblong or lanceolate-linear, 1-2in., on very short petiole, acute at base, subacute at apex, entire glabrous, densely lineolate above (so as to be rough when dried). Spikes long, 1½-5in., 4-sided, erect, terminal. Bracts much imbricated, all similar, nearly ¼in., broadly-oval, obtuse, sharply mucronate, pubescent, very slightly ciliate,

broadly bordered, with white scarious margins. Bractlets linear-lanceolate, acute. Capsule $\frac{1}{6}$in., oblong-ovoid, pubescent. Seeds with concentric furrows. Anther-cells superposed, lower white tailed. Corolla white, with rose or purple spots (C. B. Clarke). Ovary glabrous; style thinly hairy at base.

Flowers, says Trimen from Ceylon, "violet, with red dots, thin dots in the throat."

Uses:—The leaves resemble, both in smell and taste, those of thyme; while fresh, they are bruised, mixed with castor oil, and applied to the scalp in cases of tinea capitis (Ainslie).

The whole plant, dried and pulverised, is given in doses of from 4 to 12 drams in fevers and coughs, and is also considered a vermifuge (Drury).

940. *R. parviflora*, *Nees.*, H.F.B.I., IV. 550.

Syn:—Justicia pectinata, *Linn.* Roxb. 44.

Sans.:—Pindi.

Vern.:—Tavashu múrunghie; punakapúndú (Tam.); Pindi kunda (Tel.); Bir lopoṅg arak (Santal.).

Habitat:—Throughout India.

Annual; erect stems, slender, with opposite lines of pubescent, divaricately branched; upper leaves 2½-4in., linear, much tapering to base, obtuse, slightly undulate, glabrous, lanceolate, petiole obscure, lower leaves oval or rotundate, distinctly petioled. Spikes very short, about $\frac{1}{4}$in. flat, ranks of empty bracts in one plane, $\frac{1}{4}$in., linear oblong, mucronate, with a very narrow margin, glabrous, slightly ciliate, floral bracts about $\frac{1}{8}$in., ovate, obtuse, slightly mucronate, with the scarious margin wider, glabrous, ciliate; bractlets narrower than the bracts. Sepals linear lanceolate. Corolla $\frac{1}{4}$in., small (Trimen). Flowers white, with blue lines on lower lip. "Capsule $\frac{1}{5}$in., seeds small, minutely verrucose; spikes nearly all terminal, markedly one-sided" (C. B. Clarke).

Uses:—The juice of the small and somewhat fleshy leaves is considered cooling and aperient and is prescribed for children suffering from small-pox in dose of a tablespoonful or two twice daily. The bruised leaves are applied to contusions to relieve pain and diminish swelling (Ainslie).

Among the Santals the root is given as a medicine in fevers (Revd. A. Campbell).

N.B.—In Bombay, the above two species are sometimes employed by the shopkeepers to adulterate Fumitory (Fumaria officinalis); hence they are also called pitpápra there (K. R. K.).

941. *Dicliptera Roxburghiana, Nees.,* H.F.B.I., IV. 553.

Vern.:—Kirch, Semni, Lakshmana (Pb.); Bouna (Simla).

Habitat:—Frequent in the plains of N. India, from the Punjab to Assam, Silhet and E. Bengal, Bhotan.

Diffuse herbs. Stems 1-3ft., elongate, very nearly glabrate. Leaves 2½ by 1in., base cuneate, elliptic, acute, obscurely pubescent or glabrate. Petiole ¼in. Flowers in clusters, axillary and terminal, sessile, more rarely shortly peduncled. Bracts nearly ½ by ⅕in., often 3-nerved, ciliate, thinly pubescent, cuneate-elliptic obovate, apiculate, not acuminate. Corolla ¾in. Capsule ¼in., clavate, puberulous or glabrous. Seeds conspicuously verrucose.

Use:—According to Stewart, the plant is used medicinally in the Punjab.

It is said to be a useful tonic (Watt).

942. *Peristrophe bicalyculata, Nees.,* H.F.B.I., IV. 554.

Syn.:—Justicia bicalyculata, *Vahl.*, Roxb 42.

Vern.:—Nasa bhaga (B.); Barge khode baha (Santal.); Kaliandi jahria (Merwara); Ghátpitta-pápada (Mahr.); Atreelal (Hind.); Nazpat (Sind.); Chebira (Tel.).

Habitat:—Tropical and Subtropical India, from the Punjab and Sind to Assam and Madras.

Erect spreading herbs, thinly patently hairy. Leaves 2 by 1in., ovate, acuminate. Petiole ¼in. Each pair of bracts long-petioled. Bracts ⅓ by $\frac{1}{20}$in., unequal, linear or linear-spathulate, acute mucronate. Panicles lax, divaricate. Corolla ⅓-½in. Anther cells ovoid, remote, ovoid, not linear, which latter is the characteristic of the other species of genus Peristrophe Capsule ⅛-½in. Seeds minutely glandular, papillose.

Uses :—According to Rheede, the whole of the plant, macerated in an infusion of rice, is said to be a useful remedy in poisonous snake-bites. Dr. Sakharam Arjun, in his "*List of Bombay Drugs*, says that this plant is supposed to have the properties of Fumaria parviflora and is used in its stead, but has not the bitterness of that plant.

N. O. VERBENACEÆ.

913. *Lantana indica, Roxb.*, H.F.B.I. IV., 562. *Roxb.* 488.

Vern. .—Ghaneri ; Pâpar-dani (Ajmer).

Habitat .—Roxburgh writes: "A native of Mysore, from thence Dr. B. Heyne sent the seed to the Botanic garden at Calcutta, where the plants thrive luxuriantly, and blossom during the rains"

It is common throughout India and Ceylon in the warmer parts ; on the river banks of Bengal one of the commonest weeds

A shrub, 3-8 ft. high ; branches roughly hairy, long and straggling, 4 angular, sometimes prickly, yellowish brown. Leaves 1½-2½ in long, opposite or in whorls of 3, ovate, acute or subobtuse, crenate-serrate, rugose and finely pubesent on upper suface, softly white-pubescent or subvillous beneath, narrowed or somewhat rounded at the base, petioles ¼-⅜ in. long. Flowers inodorous, sessile, arranged in axillary peduncles heads or spikes ½-¾ in. long and elongating in fruit ; peduncles 1-3¼ in., usually in opposite axils, 4-angled, thickening upwards ; bracts up to ⅜ in. long, ovate, acuminate, softly hairy on both sides. Calyx 1/16 in. long, truncate, membranous, densely hairy. Corolla with a pale purplish limb ⅛ in. across, hairy outside ; tube ¼ in. long, yellowish ; lobes 4, rounded. Filaments very short. Ovary glabrous. Drupe purple when ripe, enclosed in the thin transparent calyx (Duthie).

Uses :—Mr. Duthie (Flora of the Upper Gangetic Plain, Vol. II. p. 216) writes :—"The leaves are regarded by the natives as a cure for snake-bite."

Indraji, in his valuable book 'Vanaspati Shastra" speaks

about some of the medicinal properties of the roots, leaves and flowers of Lantana Indica.

944. *L. Camara, Linn.*, H.F.B.I., IV. 562.

Vern :—Ghaneri (M); Chadurang (Kan) (According to Talbot. I. P. Fleiderer gives the following Kanarese equivalents of the plant—Natahu, hesigetin, kasutihuvina-gida). Arippu (Mal)

Habitat :—A native of America, run wild in many parts of India. "Shade ultimately kills it, but it has the power of scrambling up the branches of low trees and so reaching the hight. Its rapid diffusion has been much helped by birds, which are fond of the berries." (Trimen).

A gregarious straggling scandent shrub. Branches 1-sided with recurved prickles. Leaves simple, ovate acute Flowers in small head, pretty pink-orange or lilac, and of many shades in the same plant. Bracts linear small. Calyx small, membranous. Corolla-tube slender, limb spreading, lobes unequal. Ovrary 2-celled; Drupe freshy. Seeds without albumen

Uses :—In Mexico, the leaves of a species of Lantana, when boiled with barley, are given to women in childbirth. Another species of Lantana is much used to relieve indigestion.

In Vol. 16 of the Pharmaceutical Journal and transactions published in the year 1885 there appears a short article where it is stated that a new alkaloid named "Lantanine" was discovered by Dr Negrete, in Lantana brasiliensis, a plant which was used by Dr. E. Buiza in the central hospital at Lima, as an antipyretic; it stated that "Lantanine" like Quinine, depresses the circulation and lowers the temperature. Intermittent fevers which have not yeilded to treatment with Quinine, have given way under the use of 2 grams of lantanine.

On page 497 of Apothekar zeitung of 1909 it is stated that the leavesof Lantana Odorata are used in West Indies and South America for aromatic baths in rheumatic complaints, also as infusions for catarrahal diseases and as gargles.

In Chemisches Central Blatt of 1905 on page 307 it is stated that the fresh bark of the stem of Lantana Camara contains 60% water, 6·25% ash, 0·68% of a crystalline substance (Lantanine) 0·051% of a rubber-like substance, 1·705% besin, 2-21% resinic acid but no tannic acid; the bark of the root of Lantana Camara is supposed to contain tannic acid on the other hand.

Bacon writing in the Philippine Journal of Science in 1909 about the oil of Lantana Camara states that it possesses a pleasant odour and that the plant flourishes with such extraordinary profusion in the Philippines that it would undoubtedly pay to cultivate it.

Prof. D. D. Kanga, M. A., of Elphinstone College, Bombay, who has analysed this plant, reports as follows :—

The flowers were collected in the months of August and September from places in the neighbourhood of the Science Research Institute, Bangalore, dried in air and distilled with steam.

The leaves were also locally collected in the month of January 1912, powdered and extracted with warm alcohol for the determination of the constituents ; the alcoholic extract was steam-distilled, when an oil came over along with a little free volatile acid 28·26 grams of the fresh flowers lost 22·2 grams. of water on drying at 110 C. Hence moisture 78 per cent.

The yield of the oil from the air-dried flowers was 0·077, while that from the leaves was 0·2 per cent.

The following table gives the physical properties and some chemical constants of the oils :—

	Oil from the dried flowers	Oil from the fresh flowers	Oil from the leaves	Oil from the leaves of the South American plant, according to Messrs. Schimmel and Co's. Report, Oct. 1909.
Colour ..	Yellow	Yellow	Yellow	Pale-yellow
Odour ..	Powerful, persistent and pleasant, reminding of sage.	Powerful, persistent and pleasant reminding of sage	Powerful, persistent and pleasant, reminding of sage	Pleasant, reminding of sage.
Yield .	0·07 % by weight.	..	0·2 % by weight	Varying greatly according to age. One yield was 0·07% and another 0·245% by volume.
Specific .. gravity.	$D\frac{26°}{15°}$ 0·915		$D\frac{24°}{24°}$ 0·92111	$D\frac{30°}{4°}$ 0·9132
Refractive Index	$n_D^{26·5°}$ 1·4987.	$n_D^{26·5}$ 1·5031	$n_D^{70°}$ 1·48933	$n_D^{30°}$ 1.4913
Optical Rotation.	$[a]_{Hg}$=green +23·9°		$[a]_D$ + 1·96°	$[a]_D^{30°}$ +11·5°
Saponification Value	10	.	..	..
Acetyl value	43·6	..		.

When subjected to fractional distillation under a pressure varying from 45 to 55mm., the following fractions were collected

from the oil from the leaves, and the refractive index of each fraction determined :—

Fractions	B. P.		$n_D^{31.5^\circ}$
1.	.. 145° 154°	...	1·48395
2.	154°—165°	...	1·48914
3.	.. 165°—180°	..	1 49485
4.	... above 180°	..	1.49703

The results obtained are very similar to those recorded for the oil from the leaves of the South American plant (Phillipines).

To summarise :—

Neither the leaves, the stems nor the roots of Lantana Camara were found to contain an alkaloid.

The aqueous liquid was found to contain a large quantity of tannin and sugar; the solution in which sugar was found was glucosidic in character.

The petroleum extract of the green resin was found to contain a mixture of resin acids in very large quantities.

The neutral portion of the petroleum ether extract was found to contain very likely a mixture of palmitic and stearic acids, mixture of oleic and Emucic acids and very probably a phytosterol.

The ether extract of the resin was found to contain a crystalline substance, which is a glucoside; the formula of this substance may very probably be $C_{27}H_{42}O_4$.

The oil yeilded by flowers has got a pleasant and very powerful and persistent odour.

---

945. *Lippia nodiflora*, *Rich.*, H.F.B.I., IV. 563.

Sans. :—Vashira.

Vern. :—Bhin-okra (H.); Mokna, búkan, jalnim, jorakh, mundi, boken butee, chamiara (Pb); Ludra (P.); Wakan (Sind.) Tan (Dec.); Ratolia (Bomb.); Podutalei (Tam.); Bokenaku (Tel).

Habitat :—Abundant in wet places throughout India

An annual herb, roughly pubescent, creeping, minutely strigose, extending 6-30in, much branched, often rooting from the nodes. Stems prostrate, sub-quadrangular, glabrous Leaves numerous, small ¼-1¼ in., obovate, narrowed to the sessile base, toothed at top sharply, rather thick, minutely punctate. Flowers $\frac{1}{10}$ in. long, pink or white, crowded in axillary, long stalked, oblong-ovoid, bracteate heads. Heads at first nearly globose, but becoming spicate and oblong in fruit. Peduncles 1-3in. from axil of only of each pair of leaves. Bracts ovate, acute, or subacute. Heads ½ by ¼in., ovoid or cylindric. Calyx

minute, 2-fid, hairy. Corolla-tube cylindric, slender, mouth 2-lipped, lower lip rather longer, pinkish-purple to white (C B. Clarke). Filaments and style very short. Fruit hardly $\frac{1}{12}$ in. diam., nearly dry.

" Flowers all the year round, very pale violet-pink " (Trimen) " Stamens unequal pair, included. Ovary 2-celled, stigma capitate separating into two 1-seeded nutlets (Collett).

Uses :—The plant is officinal, and considered cooling. The tender stalks and leaves are slightly bitter, and prescribed in the form of an infusion to children suffering from indigestion, and to women after delivery. (Ainslie). It is used in Bombay as a demulcent in cases of gonorrhœa. A poultice composed of the fresh plant is a good maturant for boils. (Dymock. Honnigberger considered it valuable in ischury, stoppage of the bowels and pain in the knee-joint. In Mexico the leaves of several species of Lippia, called 'oregano' are very much used to flavour food. It is cooked with fish, sausage and other food.

946. *Verbena officinalis, Linn.*, H.F.B.I., IV. 565.

Vern. : --Pámukh, karaita (Pb) ; Shamukı (Pushtu).

Habitat :—Himalaya from Kashmir to Bhotan. Bengal Plain to the Sunderbunds.

An erect, more or less pubescent, perennial herb. *Stems* 1-3ft. high. decumbent at the base, branched 4-sided puberulous. *Leaves* 2-4 in. long, variously lobed, narrowed to the base, lower ones stalked, pinnatifid or coarsely toothed, more or less pubescent and usually hoary on the nerves beneath ; upper sessile, usually 3-partite. *Flowers* $\frac{1}{4}$ in. long, sessile in dense bracteate heads which elongate as the fruit ripens into slender spikes up to 10 in. long ; bracts ovate, acute. *Calyx* twice as long as the bracts and half as long as the corolla-tube, minutely 5-toothed, glandular-hairy. *Corolla* blue or lilac, hairy ; limb spreading, about $\frac{1}{8}$ in, diam., lobes subquadrate, throat hairy. *Fruit* dry, ultimately separating into 4 one-seeded nutlets pyrenes 3-ribbed $\frac{1}{15}$-$\frac{1}{20}$in., oblong, smooth dorsally, their under faces with minute white flaking cells.

Uses :—The fresh leaves are used as febrifuge and tonic, and as rubefacient in rheumatism and diseases of the joints ;

the plant is officinal at Lahore, being depurative and febrifuge (Stewart). Mahomedan physicians consider it tonic and astringent, useful in paralysis and amenorrhœa, and that a plaster of the leaves promotes the healing of wounds. An ointenent is recommended for swelling of the womb, and a vinegar in skin diseases. Cochin-China, the plant is considered useful in vervous complaints and as a deobstruent in dropsy (Dymock).

The root is believed to be a remedy for scrofula and snake-bite. At one time it was worn in Europe as a charm against evil, and for good luck. In Tuscany it is said to be still employed as a poultice for liver complaints, and taken internally for the same disease and for dropsy.

---

947. *Callicarpa arborea, Roxb.*, H.F.B.I., IV. 567; Roxb. 131.

Vern.:—Ghivala (Cutch); Búndún (Kol.); Dom koto-koi (Santal); Bogodi, gogdi (Karwar); Boropatri (Uriya); Sakrela (Mal.); Gœhlo (Nepal); Sunga (Lepcha); Khoja (Ass.); Makanchi (Garo); Ghiwala, dera, shiwali (Kumaun); Bormala (Beng.).

Habitat:—N. India, in the lower hills, from Kumaon to Assam, common in the Sikkim Terai; Rajmahal, E. Peninsula from the Khasia Terai and Manipur to Singapore.

A moderate-sized tree, attaining 40 ft. Branches petioles, underside of leaves and inflorescence densely grey tomentose, with short soft stellate hairs Bark brownish, rough; wood light, brownish white, moderately hard, even-grained. Leaves ovate or elongate-elliptic, acuminate, glabrous above; blade 6-12 in. Petiole 1-2½ in. long; secondary nerves 8-12 in. Flowers lilac or pale-purple with an unpleasant smell (Brandis). Cymes large, spreading. Peduncle 1-2 in. long. Calyx $\frac{1}{20}$in., puberulous. Corolla $\frac{1}{8}$ in., long, Berry $\frac{1}{10}$in. diam., purple, ultimately black.

Uses:—The bark is aromatic and bitter, and is applied in decoction in cutaneous diseases It is considered tonic and carminative (Watt. ii 26).

948. *C. lanata, Linn.*, H.F.B.I., IV. 567; Roxb. 131.

Syn.:—C. Wallichiana, *Walp.*

Vern. :—Bastra (H.); Massandari (B.); Aisar (Bom.); Koat-Komul (Tam.); Tondik-teregam (Mal.)

N B.—The plant known as *Aisar* at Matheran is *Callicarpa Cana, Linn*, (K R.K.)

Habitat :—Western and Southern India and the Circars.

A small or moderate-sized bushy tree, 30-40ft. Branchlets stout, cylindric, closely covered with a thick felt (easily detached) of stellate hair, young parts very densely stellate-tomentose. Leaves large 6-9in., ovate, rounded or obtuse at the base, slightly acuminate, acute, entire, glabrous when mature, rugose and bright green above, densely covered with a close felt of white or yellowish stellate hair beneath. Petiole ¼-2in., stout, very tomentose Flowers pale pinkish, lilac, sessile, in clusters of 3 Cymes shortly pedunculate, divaricately branched, densely stellate-tomentose. Bracts linear Calyx membranous, stellate-tomentose. Corolla glabrous, tube ⅛in., lobes oblong, obtuse, recurved Anthers cream-coloured Drupe under ¼in., globose, black, shining

Uses .—Both leaves and bark are faintly aromatic and bitterish, and afford much mucilage when boiled The leaves boiled in milk are used as a wash for aphthae of the mouth, and that the bark and root boiled in water yield a decoction which is used to lessen febrile heat and remove hepatic obstruction and hepatic eruptions (Rheede) Ainslie says that "this plant is reckoned by the Javanese amongst their emollients. The bark possesses a peculiar sub-aromatic and slightly bitterish taste and may probably be found to have other medicinal virtues. The Malays consider the plant as a diuretic" According to Drury, the root is employed in Upper India in cutaneous affections. In Ceylon the leaves and bark are used both internally and externally. The bark is said also to be chewed (Trimen).

949. *C. macrophylla, Vahl.*, H F.B.I., IV. 568.

Syn :—C. incana, *Roxb.* 131.

Vern. :—Pattharman, súmáli, denthar, daya (Himalayan names); Mathara, mattranja (Beng.); Bá-pattra, bauna (Pb.)

Habitat :—Throughout N. and E. India, ascending to 6,000ft.

in the W. Himalaya; from Kashmir to Assam; abundant in Bengal plains, (?) Deccan Peninsula.

An erect shrub, 4-8 ft. high, with straggling branches. Branches, leafstalks and inflorescence densely clothed. Bark thin, grey brown. Wood white soft (Gambles), with tawny wool-like to mentum. Leaves shortly stalked, 6-10in. long, by 2-3in. broad, lanceolate crenate or sharply toothed, long-pointed; at times ovate or ovate-lanceolate. Upper surface wrinkled, stellately-pubescent; lower, tomentose; lateral nerves 12-15 pairs. Petiole $\frac{1}{3}$-$\frac{1}{2}$in. Flowers hardly $\frac{1}{5}$in long, pink, crowded in axillary stalked cymes. Calyx bell-shaped, minutely 4-toothed, $\frac{1}{20}$in. Corolla tubular regular 4-lobed, tube short. Stamens far protruding, equal, 4. Anthers small exserted. Ovary 2 or 4-celled; style long, stigma minutely capitate. Fruit a spongy succulent globose drupe, white with 1 one-celled pyrenes, when ripe fully (Collett and Kanjilal)

Uses:—In Hazara the leaves heated are applied to rheumatic joints. (Stewart.) "The leaves," says Trimen, "have a peculiar scent, mixed fetid and lemon-like, and are used for flavouring native soups and curries. An aromatic oil is also obtained from the root and used as a remedy in disorders of the stomach."

---

950. *Tectona grandis*, *Linn.*, *f.* H.F.B.I., IV. 570; Roxb. 202.

Sans.:—Sâka.

Vern:—Sagun (Hind.); Segun (Beng.); Singun (Uriya); Tekku, tek (Tam.); Teku (Tel.); Jati (Mal.); Saj, sal (Arab. and Pers.); Ságwán or Ság (Bomb.); Tegina-mara, Sâguvâni, Sagoni-Mara (Kan.).

Habitat:—W. Deccan Peninsula, from Central India to Orissa.

A large deciduous tree, 80-120 fit. high; branchlets 4-angular, stellately tomentose. *Leaves* about 12 in. long (or much larger in seedling specimens), elliptic or obovate, acute or acuminate, entire, usually cuneate at the base; upper surface rough, but glabrous, the lower densely clothed with grey or yellowish tomentum, main lateral nerves 8-10 pairs. *Flowers*

many, on short pedicels and arranged in large terminal much-branched tomentose cymose panicles 1-3 ft. long; bracts at the forks lanceolate, those beneath the calyx narrower. *Calyx* (in flower) $\frac{1}{8}$ in. long, broadly campanulate, stellately tomentose; lobes $\frac{1}{20}$ in. long, subequal, spreading; the whole calyx ultimately enlarging to 1 in. or more and forming a membranous bladder-like covering to the fruit *Corolla* white, glabrous, limb $\frac{1}{4}$ in across; lobes subequal, spreading *Fruit* subglobose, $\frac{1}{2}$ in. in diam., somewhat 4-lobed, pericarp soft, densely clothed with felted stellate hairs.

Uses:—A plaster of the powdered wood is recommended in hot headaches and for the dispersion of inflammatory swellings; when taken internally it is said to be beneficial in dyspepsia, with burning of stomach. It also acts as a vermifuge. The ashes of the wood are applied to swollen eyelids and are said to strengthen the sight. The bark is an astringent, and the oil of the nuts promotes the growth of hair and removes itchiness of the skin. The flowers, according to Endlicher, are diuretic, and Gibson states that the seeds possess similar properties (Dymock).

The wood rubbed down with water into a paste allays the pain and inflammation caused by handling the Burmese black varnish *Thitsi* (Melanorrhœa usitatissima). It also deserves to be tried as a local application to inflammations arising from the action of the Marking Nut (Ph. Ind.) The oil is extracted from the wood in Burma, and is used medicinally as a substitute for linseed oil and as varnish (Mukerji.) The tar is used in the Konkan as an application to prevent maggots breeding in sores on draught cattle (Dymock).

At a meeting of the Nilgri Natural History Society in 1887, Mr. Lawson showed a specimen of a whitish mineral substance found in a teak tree growing in the Government Plantation at Nilambur. This peculiar secretion is not altogether unknown to officers in the Forest Department, and its composition has on more than one occasion been investigated by chemists.

The late R. Romanis (Jn. Chem. Soc., 3-11-87) found that alcohol extracts a soft resin from teak wood, but no oil or varnish. On distilling the resin he obtaind a crystalline substance which he also found to be present in considerable quantity in the tar resulting from the destructive distillation of teak. The analyses which he has made of the crystals point to the empirical formula $C_9 H_{10} O$; on oxidation with nitric acid they yield what appears to be a quinone of the formula $C_{18}H_{16}O_2$.

951. *Premna integrifolia, Linn.*, H.F.B.I., IV. 574.

Syn. :—P. spinosa, *Roxb.*

Sans. :—Ganikáriká, Agnímanthâ (produces fire by friction); Matha (churner); Ketú (fallingstar); Araní (stinginess); Vaijayantíka (flag bearer).

Vern :—Agetha, arní (Hind.); Ganiarí, bhut-birarví (Beng.); Gineri (Nepal); Ganniari (Oudh); Bakarcha (Garhwal); Erumaimullai; Munnay (Tam.); Chebu-nelli, pinna-nelli (Tel.); Châmâri (Mar.); Appel (Mal.) Narvel Bom.); Arni Guz.); Aguyábát (Uriya).

N B.—Premna scandens, Roxb., is *Chamhari*. It is called *chavâri-vel* at Matheran, *vel* or "yel" popularly for *vel*, *i.e.*, a creeper, whereas *Pr. integrifolia, Linn.* is a shurb or a small tree (K.R.K.).

Habitat:- India, near the sea, from Bombay to Malacca; Sylhet.

A small evergreen tree or shrub with thorny stems and branches. Bark thin pale yellow lenticillate Wood light creamy brown, moderately hard, even-grained, pleasantly scented. Young parts glabrate or very slightly pubescent. Leaves 2-3in., broadly-oval, acute or rounded at base, acute or subacute, entirely or faintly crenate-serrate in upper part, always quite glabrous Flowers on short pubescent pedicels, pale yellowish green Cymes corymbosely paniculate, dense, pubescent, terminal. Calyx shallow 2-lipped, one lip entire, the other 2 lobed (so that the calyx appears 3-lobed), segments obtuse. Corolla-lobes rounded, lower ones somewhat longest; stamens slightly exerted. Drupe $\frac{1}{8}$in. globose.

Uses :—Sanskrit writers describe the root as bitter, stomachic and useful in fever, anasarca, urticaria, &c. A soup made of the leaves is occasionally used as a stomachic and carminative. The root forms an ingredient of *dasamula*, a preparation often prescribed by the native physicians in obstinate fevers (Hindu Mat. Med.). Rheede notices a decoction of the leaves for flatulence.

The root is given in decoction as a cordial and tonic. The leaves rubbed along with pepper are administered in colds and fevers. The whole plant is used in the form of decoction in rheumatism and neuralgia (Atkinson).

Chemical composition.—The root-bark of this plant afforded a yellowish-brown powder giving an orange-brown tincture with alcohol. The tincture when evaporated left a reddish coloured tasteless resin and some extractive matter. The resin was soluble in ether and in alkaline liquors; from the latter solution it was precipitated in greyish-brown flocks by acids. Warmed with soda, the resin evolved an odour of lemon similar to that of Kamala resin; heated with sulphuric acid a transient purple colour was developed and a fragrant odour evolved. It showed no disposition to crystallize The watery solution of the alcoholic extract had a sweetish taste in small quantities and was nauseous in larger quantities. It contained a bitterish amorphous alkaloid, a substance reducing Fehling's solution, and an astringent body, striking a green colour with ferric chloride, but giving no precipitates with gelatine. The alkaloid gave no distinct colour reactions with the strong mineral acids.

952. *P. tomentosa*, *Willd*., H.F B.I., IV. 576.

Vern.—Nagunu-Chettu (Tel.); Pedanganeree, Kollay-Cotlay wellag (Tam.).

Habitat:—Deccan peninsula and Ceylon, frequent; from the Circars and Central Provinces southward.

A tree, often 50ft., branchlets densely stellate-woolly. Leaves 6 by 3½in., base rounded or subcordate, coriaceous, minutely glandular scabrous above, nerves 7 pair; petiole 1in. Corymbs ¾in. diam., often sessile, upper branches (or nearly all) alternate; bracts ½ in., linear Calyx $\frac{1}{11}$in., stellately woolly Corolla ⅛-¼ in., 2 lipped, hairy in the throat, greenish-yellow. Drupe ⅛in. diam., deciduously hairy, ovoid, 3-1-seeded.

An aromatic oil is obtained from the root, and used as a remedy in disorders of the stomach (Trimen)

953. *P. latifolia*, Roxb.

Var.—Mucronata Roxb., H.F B.I. IV., 578; Roxb. 485.

Vern..—Bakar, bakarcha, basóta agniúm (Hind.); Agniú (Kumaun); Ban, khar, gián (Pb.).

Habitat:—N. India, from Kumaon to Bhotan and the Khasia Hills., also common in Bengal Plains.

Uses:—Dr. P. S. Mootooswamy states that the leaves are diuretic, and are given internally and applied externally in dropsy. An infusion of 10 drachms of the leaves and 2 drachms of coriander in ten ounces of boiling water has been used by him with advantage in acute dropsy.

Dr. Mootooswamy has seen the natives using the leaves soaked in goat's urine or in onion juice for dropsy; sometimes chebulic myrobalans are added if the bowels are costive.

A small or medium-sized deciduous tree; branchlets and young leaves pubescent or velvety. *Leaves* membranous, drying black, 3-6in. long broadly ovate, sharply acuminate, usually quite entire, base cuneate; upper surface glabrous when mature, the lower hairy especially on the midrib, petioles $\frac{1}{2}$-$\frac{3}{4}$in. long. *Corymbs* broad, usually terminating short leafy branchlets, rusty pubescent. *Calyx* 5-toothed, clothed with spreading hairs. *Corolla* greenish-white, $\frac{1}{8}$in. long, pubscent within. *Drupe* globose, verrucose.

Use:—The milk of the bark is applied to boils, and the juice is given to cattle in colic (Atkinson). The juice is applied medicinally in the Punjab (Stewart).

954. *P. esculenta*, *Roxb.*, H.F.B.I. IV., 580; Roxb. 485.

Habitat:—Assam and Chittagong. A cultivated plant.

A short-stemmed entirely glabrous shrub; branching, 6-8ft. Leaves $6\frac{1}{2}$ by 3in., obovate or elliptic-acuminate, sharply serrate, base entire, cuneate suddenly narrowed, sometimes very shortly cordate, mature glabrate, nerves 5 pair; petiole $\frac{1}{4}$in., slender obscurely puberulous. Corymbs compact, nearly glabrous, $2\frac{1}{2}$in. diam, short-peduncled, globose many-flo; bracts $\frac{1}{16}$in., linear. Calyx $\frac{1}{16}$in., cup-shaped, obscurely puberulous; minutely 5-toothed somewhat enlarged, more distinctly toothed in fruit. Corolla $\frac{1}{8}$in., yellowish white, 2-tipped, throat hairy. Drupe $\frac{1}{8}$in, globose or somewhat obovoid, usually 3-4 seeded.

Use:—The natives of Chittagong employ the leaves medicinally (Roxb.).

955. *P. herbacea*, *Roxb.* H.F.B.I., IV. 581; Roxb. 485.

Habitat:—Subtropical Himalaya, from Kumaon to Bhotan. S. Deccan Peninsula.

Sans.:—Bhumijambu, bhumi-jamberka.

Vern. :—Bhuijám (B.); Kada met (Santal.); Nála niredu (Tel.). Gantu Bhârangi (Madras).

A small inconspicuous undershrub, produced unusually from woody rootstocks after the jungle fires Stem hardly any. Leaves simple sessile, 4 by 2-3in., cuneate or obovate, serrate pubescent, mature pubescent on the nerves which are in 5 pair. Corymbs 1½in. diam, pubescent, somewhat dense; peduncles 0-1½in. Flowers greenish white, 4-lobed. Calyx $\frac{1}{10}$in closely pubescent, lobes ovate obtuse, sub-segmently 5 toothed Corolla ⅛in, hairy in the throat, 4-lobed, obscurely two-lipped Drupe ¼in. diam, globose, black when ripe, with one pyrene. Roots about as thick as a crowquill with numerous almost globular woody knots. "A good example of a plant belonging to a genus mostly represented by trees or shrubs, and which has become permanently dwarfed by continuous exposure to periodical fires" (Duthie)

Use :—A preparation of the root is given internally for rheumatism by the Santals (Revd A Campbell

This plant is frequently confounded with Clerodendron serratum, Spreng., the roots and stems of which are sold under the name of Bharangi. In Sanskrit, Bharangi bears the names of Bhargi, Brahmayashtika, Hangika, Bringa-ja and Vardhaki, and is described in the Nighantas as hot, bitter, pungent, and digestive; a remover of dropsy, cough, phlegm, asthma, fever, and rheumatism The juice of the root is given with the juice of ginger and warm water in asthma, and it enters into the composition of several compound decoctions for diseases of the lungs A confection called Bhargi-guda is prepared with a decoction of the root, and the ten drugs called Dasamula, chebulic myrobalans, treacle, and aromatics. An oil prepared with the root is recommended for external application in the marasmus of children (Chakradatta).

The properties of P. herbacea agree much more nearly with those attributed to Bharangi in the Nighantas, than do those of Clerodendron serratum, although the latter plant is at the present time in use as Bharangi throughout the greater part of India. Dutt attributes the drug to C. Siphonanthus, but the samples we obtained from Bengal consisted of the stems of C serratum Bombay was formerly supplied from the Circars with P. herbacea, but now uses C. serratum.

Chemical composition.—The constituents of this root resemble to a great extent those found in P. integrifolia. An orange-brown acid resin soluble in ether, alcohol and alkaline solutions, and traces of an alkaloid are the most important. There is a quantity of starch in the root, and an entire absence of astrigency (Pharmacographia Indica II, pp. 68-70).

956. *Gmelina arborea, Linn.*, H.F.B.I., IV. 581 ; Roxb. 486.

Sans. :—Kásmari (growing in Káshmere), Sarvato-Bhadra (auspicious in every quarter), Shri-parni (fortune-leaved), Krishna-vrintaka (black stalk), Kambari (of variegated color), Hira (a plant).

Vern. :—Kúmhár gúmhar, kákódúmbari (Hind. and Pb.) ; Gúmar, gúmbár (Beng.) ; Gambari (Nepal) ; Gomari (Ass.), Numbor (Lepcha) ; Bolkobak (Garo) ; Gumadi, cummi (Tam.) ; Gúmar-tek, pedda-gomru, tagumúda (Tel.) ; Shewney, kuli (Kan.) ; Kurse (Gond) ; At-demmata (Cingh.) Shewan, Shivan (Mar.).

Habitat.—Throughout the Dekkan and Konkan, C. P., Berar, North West Himalaya, Ceylon, Chittagong, Eastern Bengal.

An unarmed deciduous tree, up to 60ft. high ; bark somewhat corky, greyish outside and yellow within ; young parts covered with white mealy pubescence. *Leaves* 4-8in. long, broadly ovate, acuminate, entire ; upper surface glabrous when mature, lower persistently clothed with fulvous stellate hairs, base cordate or truncate and shortly cuneate ; petioles 2-3in. long, cylindric, puberulous, glandular at the top. *Flowers* in small usually 3-flowered cymes which are arranged along the branches of a densely fulvous-tomentose panicle, about 12in in length : buds clavate, angled , bracts $\frac{1}{8}$in. long, linear lanceolate. *Calyx* broadly campanulate, $\frac{1}{5}$in. long, densely fulvous-tomentose , teeth small, triangular, acute. *Corolla* 5-lobed, $1\frac{1}{2}$in long, brownish-yellow, very hairy outside ; upper lip $\frac{3}{8}$-$\frac{1}{2}$in. long, deeply divided into 2 oblong obtusebes lower lip about twice as long, 3-lobed, the middle lobe much longer than the lateral ones and with a crenulate margin. *Drupe* $\frac{3}{4}$-1in. long, ovoid or pyriform, smooth, orange-yellow when ripe.

Uses :—In Hindu medicine, the juice of the leaves is used to remove fœtid discharges and worms from ulcers (Dutt). The fruit is officinal in the Punjab. The root is bitter, tonic, stomachic and laxative ; given in cough, rheumatism, fever and indigestion, and is said to have anthelmintic properties (Watt).

In Bombay, the juice of the young leaves is used as a demulcent in gonorrhœa, cough, etc., either alone or combined with other drugs of similar properties (Dymock).

Chemical composition.—The root reduced to fine powder lost 8·39 per cent. at 100°C. The ash amounted to 14·41 per cent., and was free from any trace of manganese.

On analysis the following results were obtained:—

Petroleum ether extract	.. ..	1·80	per cent.
Ether	,, ..	21	,, ,,
Alcoholic	,, ...	4·274	,, ,,
Aqueous	,, ...	19·560	,, ,,

The petroleum ether extract consisted of a yellow viscid oil, with slight siccative properties On standing, white grains separated, which were non-crystalline when examined microscopically. In alcohol the extract was partly soluble; no alkaloid was present. The ether extract was yellowish-white, and contained a trace of oil; it gave no reaction with ferric salts; in addition to resins a trace of benzoic acid was present.

The alcoholic extract was yellow and brittle; with water a turbid mixture was obtained, which had a bitter taste. In addition to resins, a trace of an alkaloidal principle was detected.

The aqueous extract was sweetish and slightly bitter, and easily reduced Fehling's solution on boiling

The fruit contained butyric acid, with a trace of tartaric acid a trace of astringent matter giving a greenish coloration with ferric chloride, an alkaloid, and a white principle, non-crystalline, and neutral, with resin and saccharine matter.

The alkaloids present in the fruit and in the root appear to be identical. The amount present in each case was very small, not exceeding a trace. (Pharmacographia Indica III, 71-72).

957 *C. asiatica*, *Linn.*, H.F B.I., IV. 582; Roxb. 487.

Sans.:—Biddari

Vern.:—Badhara, Nàg-phul (Hind.); Gannuelu, Chinta ganer Chelu (Tel.); Nalacomul (Tam.); Nilak-kumizh (Tam.); Challa-gummudu (Tel.); Nilak-kumazh (Mal.); Láhán shivan (Mar.).

Habitat:—Deccan Peninsula and Bengal.

Flowers appear along with young foliage. 4 upper lobes dull orange-pink, lower one lemon-yellow.

A large straggling shrub, with bright yellow flowers sometimes climbing, branches frequently spinescent, at times unarmed. Bark brownish white thin. Wood hard grey. Leaves ½-1½in., ovate or obovate, frequently lobed, pubescent when young; mature beneath, glabrous glaucescent from a coat of

minute round glands (C. B. Clarke). Petiole ¼in. Racemes 1-2in., bracts ⅛in. caducous. Calyx ⅛in., tomentose, but with large bare glands. Corolla 1½in., tomentose with glabrous glands. Drupe ¼in., long ovoid or obovoid 1-2-seeded.

Use :—Used for rheumatism, pains in the loins, and syphilitic diseases. It was known to the Portuguese under the name *Rais Madre de Deos* The root was in great request in Goa as an antidote to every poison, and a remedy for every disease in former days. The roots are slightly bitter, astringent, and aromatic (Dymock). It is regarded by the Hindu doctors as a demulcent and alterative. "The leaves and young shoots of this shrub abound with a thick, viscid mucilage, which is imparted readily to cold water, which, when thus impregnated, is employed by the natives in the treatment of gonorrhœa to allay ardour urinae" (Pharm. Ind). At the present time the root is principally employed as a demulcent for gonorrhœa and catarrh of the bladder (Watt).

958. *Vitex trifolia*, *Linn. f.*, H.F.B.I., IV. 583 ; Roxb. 481.

Sans :—Sindhuvara ; Sindhuka.

Vern.:—Nishinda (B.) ; Pani ki sanbhálu, sambhalus (H.); Nirnochi (Tam.) : Vavilli (Tel.) ; Lingoor (Mar.) ; Páni-ki-Sambhâlû (Dec.) ; Nira-lakki-gida (Kan)

Habitat :—Scattered throughtout India, in the tropical and sub-tropical region, from the foot of the Himalaya to Ceylon, nowhere common

A shrub or small tree. Shoots hairy or tomentose. Leaves, opposite, 3-often 1-foliate. Leaflets sessile, pleasantly aromatic 1-3in., obovate or ovate oblong sub-obtuse entire, glabrate above ; beneath tomentum of matted, scarcely stellate hairs, so close as with difficulty to be scraped off. Petiole 1in. Panicles terminal penultimate axillary, closely white tomentose ; 1-4in. oblong, often leafy at the base ; bracts minute, peduncles often added. Calyx ⅛ ⅙in ; cup-shaped minutely 5-toothed. Corolla tomentose, lavender to blue, ⅓-½in , small tubular. Stamens 4, didynamous. Filaments hairy at the base. Drupe ⅕in. diam., black.

Uses :—The leaves useful in special diseases and after parturition and also in cutaneous diseases, said to regulate the bile and increase the appetite, also applied externally in enlarged spleen, contusions, sprains and rheumatism (Mukerjee).

The powdered leaves have been given with success in cases of intermittent fevers, and the flowers are prescribed with honey in fevers accompanied with vomitting and severe thirst. Pillows stuffed with the leaves of this plant are used to cure catarrh and headache. The leaves are considered useful as an external application to all rheumatic pain, sprains, etc. Fruit employed in amenorrhœa, etc (Agra Exhibition)

Bontius speaks of it as anodyne, diuretic and emmenagogue, and testifies to the value of fomentations and baths prepared with it in the treatment of "Beri beri" and in the burning of the feet (*Ignipedites*) in natives (Ph Ind.).

959. *V. negundo, Linn.*, H.F.B.I., IV. 583; *Roxb* 182.

Sans..—Nirgundí.

Vern. :—Sambhalú, nirgandi (Hind.), Nishinda (Beng.); (Venn.); Aslaq (Arab.); Sisbau (Pers.), Shánbáli (Dec.); Noch-chi, chinduvâram, (Tam.); Tellavávilli Sindhuvâramu, (Tel.); Billnekki, Karlakki, lakki-gida (Kan); Kiyon-bhánbin (Burm.); Katri (Bom.); Lingoor (Mar.); Banna (Pb).

Habitat :—In the warmer zone, a universal plant throughout India. Thana district freely growing.

A small tree or shrub about 3ft. high, deciduous, strongly scented; branchlets, underside of leaves and inflorescence clothed with short grey or white pubescence. Bark thin grey. Wood greyish white, hard. Leaves 3-5-foliate (simple and more distinctly crenate on luxuriant young shoots) with a raised line across the stem at the base of the petioles. Leaflets lanceolate, 1·5in., by $\frac{1}{3}$-$1\frac{1}{3}$in., the lowest pair smallest sessile or sub-sessile, the midpart, if present, more or less distinctly petiolulate, the odd leaflet largest and with a petiolule $\frac{1}{3}$-$\frac{3}{5}$in.,

long, entire or distinctly crenate above the middle, glabrescent above, grey pubescent beneath. Flowers small. Panicles upto 12in. long. Calyx $\frac{1}{10}$-$\frac{1}{6}$in., 5-toothed. Corolla very hairy in the throat $\frac{1}{5}$-$\frac{1}{2}$in., middle lobe of the lower lip the largest. Stamens 4, didynamous, exserted. Ovary 2-4 celled, 4-ovuled; style filiform, shortly 2-lobed. Fruit a succulent drupe supported by the more or less accrescent calyx, $\frac{1}{6}$-$\frac{1}{4}$in. diam., globose, black when ripe. Endocarp normally 4-celled (Kanjilal).

The branches are apt to be attacked by Cuscuta reflexa (Dodder), says Gamble.

Uses :—" Sanskrit writers mention two varieties of Nirgundí—that with pale blue flowers is called Sindhuvára (Vitex trifolia), and that with blue flowers is called Nirgundí. The properties of both are identical, but the latter is generally used in medicine. The root of V. Negundo is considered tonic, febrifuge and expectorant. The leaves are aromatic, tonic and vermifuge. A decoction of Nirgundi leaves is given with the addition of long pepper in catarrhal fever with heaviness of head and dullness of hearing. A pillow stuffed with the leaves of Nirgundí is placed under the head for relief of headache. The juice of the leaves is said to have the property of removing fœtid discharges and worms from ulcers. An oil prepared with the juice of the leaves is applied to sinuses and scrofulous sores" (Hindu Mat. Med.). Dr. Fleming remarks that the leaves are discutient, and are useful in dispersing swellings of joints from acute rheumatism and of the testes from suppressed gonorrhœa. The people of Mysore are in the habit of treating febrile, catarrhal and rheumatic affections by means of a vapour bath prepared with this plant. Roxburgh also mentions the use of the decoction of the leaves as a bath in the puerperal state of women in India, and Ainslie states that the Mahomedans smoke the dried leaves for the relief of headache and catarrh. The dried fruit acts as a vermifuge (Pharm. Ind.).

Dr. Hove (1787) states that the Europeans in Bombay call it the fomentation shrub, and that it is used in the hospitals

there as a foment in contractions of the limbs occasioned by the land winds. In the Concan, the juice of the leaves with that of Máká (Eclipta alba) and Tulasi (Ocimum sanctum) is extracted, and Ajwán seeds are bruised and steeped in it, and given in doses of six massas for rheumatism. The juice in half tolá doses with ghi and black pepper is also given, and in splenic enlargement 2 tolás of the juice with 2 tolás of cow's urine is given every morning (Dymock)

Chemical composition.—The leaves contain principally an essential oil and a resin. The oil possesses the odour of the drug and is neutral and almost colourless. The resin dissolves in alkaline solutions with a reddish-brown colour, softens below 40° C, and gives off aromatic vapours when heated. A tincture of the drug gives a green colour with ferric chloride. The ash of the air-dried leaves amounts to 7-75 per cent.

The fruits contain an acid resin, an astringent organic acid giving a green colour with ferric salts and a precipitate with gelatine, malic acid, traces of an alkaloid and colouring matter. The fruits previously dried at 100° gave 6-8 per cent. of ash (Pharmacog Indica III. 75).

960. *V. pedùncularis, Wall., Var. Roxburghiana,* H.F B.I., IV. 587 ; Roxb 182

Vern —Boruna ; Goda (B) ; Osai (Ass.) ; Bhadu, marak, (Santal) ; Karwru (Magh.), Hila-anwal (Cachar) ; Shelangri, (Garo) ; Navaládi (Kan. .

Habitat · Behar, at Parasnath, E. Bengal and Khasia Terai.

A middle-sized or large deciduous tree, 20-40 ft. Bark thick. Wood purplish or reddish grey, hard, close-grained youngest shoots minutely grey pubescent, branchlets, petioles, and leaves glabrous. Leaves 3 foliate. Leaflets 4½ by 1in., acuminate, lanceolate ; mature glabrate above, densely covered by minute shining yellow resinous glands beneath, midrib sometimes puberulous ; petiolule of the middle leaflet ⅛-¼in Petiole 2-4in , slender or sometimes slightly winged. Peduncles 3-4in., from the penultimate axils. Panicles often 6-8 by 2in., open. Bracts $\frac{1}{12}$in. linear. Calyx $\frac{1}{10}$in , grey-pubescent sub-truncate, Corolla, ⅛in., grey-pubescent lower lip longer than the tube. Drupe ⅛in. diam., cuboid globose. There are

shining resinous glands on the corolla ; and calyx also. Flower yellowish or greenish white.

Use:—In Chutia Nagpur, the bark is used for making an external application for pains in the chest (Revd. A. Campbell).

961. *V. glabrata*, *Br.* H.F.B.I., IV. 588.

Vern.:—Goda, horina, ashwal (Beng.) ; Luki neva-ledi (Tel.); Sengenit karril (Kan.) ; Tokra (Magh.) ; Sherasa (Mar.); Htouksha (Burm.) ; Sheras ; Longarbisthiras (Bom.).

Habitat :—From S. Assam and Cachar to Deccan Peninsula.

A large deciduous tree ; wood grey, handsome, with a satiny lustre, moderately hard, close-grained, durable. Youngest shoots slightly fulvous-tomentose or woolly. Leaves almost glabrous, mostly 5-3 foliate. Leaflets 5 by 2¼in., ovate or oblong, subentire, acute or cuneate at both ends, entire, rarely toothed, mature with scattered appressed minute hairs beneath, younger very softly hairy or subtomentose. Petiolules ¼-¾in., upperside without resinous glands. Petiole 1-4in., not winged. Peduncles long or often short. Cymes dichotomous. Flowers somewhat numerous, mostly shortly pedicelled ; bracts inconspicuous. Calyx $\frac{1}{10}$in., minutely toothed, usually glabrous in the lower, hairy in the upper part. Corolla ⅓-½in. long, white and purple, tomentose, "ochroleucous," says C B. Clarke, which means yellowish white or buff ; further Mr. Clarke adds thus :—"Lowest segments much the largest, hairy blue-purple" Filaments minutely hairy. Pistil glabrous Drupe ⅓-½in. long, succulent, obovoid.

Use :—The bark and root are used as astringents

---

962. *Clerodendron inerme*, *Gærtn.*, H.F.B.I., IV. 589 ; Roxb. 477.

Sans. :– Kshudrâgnimantha, kundali.

Vern.: –Sang-kuppí, sáng-kúpi, lán-jai (H.); Bun-junat, bun-join, bonjoi, bán-jai, ban-juen, batraj (B.) ; Vanajâi (Bom.) and Mar.) ; Isandhári, sangkupi (Duk.) ; Shengan-kuppi, pinashengam-kuppi, shangam-kupi, pinari (Tam.) ; Pishinika, uti

chettu, pisangi, pisingha, tak-kolapu-chettu, nalla-kupi, eru-pichecha eti-pisi-nika, pounika, eru puchcha (Tel.). Vishama-dhâri, Kuṇḍali (Kan); Nirvochchi (Mal).

Habitat :—India and Ceylon near the sea, from Bombay to Tenasserim.

A straggling almost scandent evergreen shrub, 3-7ft. Young shoots minutely grey pubescent. Leaves opposite, rarely ternate, dark green, ¾-1½in. entire elliptic or ovate, nearly coriaceous, base cuneate young somewhat grey pubescent Petiole ⅛-⅓in. long. Flowers showy white, in axillary pedunculate 3-9-fid. cymes. Bracts $\frac{1}{30}$in linear, pedicels ⅛-½in. Calyx grey puberulous or glabrate Corolla tube ¾in. long, ⅓in broad, pear-shaped, spongy hardly succulent, smooth hardly sulcate. Separating into 4 long woody pyrenes.

Uses :—Ainslie says the juice of the leaves and root is considered alterative in scrofulous and veneral affections, the dose being a tablespoonful with or without a little castor oil. Rheede speaks of the use of the dried leaves for the same purpose, and of a poultice, of the leaves to resolve buboes, he also says a bath prepared with them is used in mania, while the root boiled in oil affords a liniment useful in rheumatism. The Malays and Macassars administer the berries or the root to people poisoned by eating unwholesome fish; the leaves smeared with oil are heated over the fire and applied to recent wounds; they are also one of the leaves used for preparing the green rice of the Malays. In Bombay the plant has a great reputation as a febrifuge; the juice of the leaves is used in doses of half an ounce. It is mucilaginous, very bitter, somewhat saline, and with a fragrant, apple-like odour

The medicinal properties of C. inerme closely resemble those of Chiretta. The dried leaves have been found to be quite as efficient as the juice of the fresh plant; they should be dried in the shade to preserve their aroma, and may be administered in decoction with aromatics, or powdered and made into pills. A tincture has also been found to be an efficient preparation.—(Dymock).

Chemical composition.—A proximate analysis of the leaves gave the following results :—

Etherial extract	..	...	4·77
Alcoholic „	...	...	5·70
Aqueous „		.	15·54
Alkaline „	..	...	11·41
Organic residue	...	...	50·06
Inorganic „	..	...	6·44
Moisture „	..	...	6·01
		Total	100·00
Ash soluble in water	..	..	44·14
„ „ in acid	...	...	47·10
Sand and silicates	...	...	8·76
		Total	100·00
Sodium chloride in ash	...	...	24·01

The bitter principle is entirely removed by ether, and the subsequent treatment by alcohol and water affords extracts which are free from any bitterness.

The dual nature of the bitter principle seems to show a very remarkable resemblance with that found in Chiretta (Swertia Chirata), a gentianaceous plant.

The leaves, when distilled with water, yield a stearopten-like body having the fruity flavour of the fresh plant. The ether extract was fragrant, green, and of a greasy consistence. The alcoholic extract contained some resinous matter, and much of the salt, which was left as cubical crystals when evaporated. Water dissolved out gum and brown colouring matter. Neither tannin nor starch was present in the leaves. They left on gentle incineration as much as 15·29 per cent. of ash, and the large amount of salt in this ash indicates the habitat of the plant as being in close proximate to the sea. (Hooper, in Pharm. Record, Aug. 1st, 1888).

963. *C. phlomoides, Linn.*, H.F.B.I., IV. 590; Roxb. 477.

Sans. :—Váta-ghni.

Vern. :—Urin, pírun (H.); Panjot (Santal); Gharayt (Sind.; Irun, arai (Guz.); Airan (Bom.); Airanmula (Mar.); Talúdalel, taludala, vatamadakki (Tam.); Telaki, nellie, tekkali, teleki, tilaka (Tel.).

Habitat :—From the N.-W. Himalaya Terai to Ceylon, general in the drier climates, extending to Behar and Orissa (not to Bengal). Ratnagiri and Thana Districts (K.R.K.).

A small tree, up to 30ft. high, or large pubescent semiscandent shrub. Bark light brown thin smooth. Wood grey hardclose-grained. Branches cinercous. Leaves small 1½-2½in. long,ovate or rhomboid more or less sinuate-crenate, often broader han long, truncate subcordate at base, often apiculate, undulate, rather thick puberulous beneath. Petiole ½-1in. pubescent. Flowers white or pink, fragrant, moderate-sized on slender pubescent pedicels ; cymes small, axillary, dichotomous combined to form a rounded terminal panicle. Bracts small leafy, oblong, obtuse, mucronate. Calyx large, over ⅜in., segment cut fully half way, ovate acuminate, glabrous, veiny. Corolla-tube 1in , slightly pubescent outside, lobes ⅓in , very nearly equal, oval or elliptic-obtuse. Drupe, not seen, says Trimen Dry, ⅓-½in. long separating in 4 pyrenes, says Brandis, slightly succulent, says C. B. Clarke.

N. B.—The specific name is given by Trimen as C. Phlomides, *Linn f.* He says it is incorrectly given as C. Phlomoides (K.R.K.).

Mr. H. H. Haines, I. F. S. gives *Safed tekar* as its Marathi name, and mentions a variety of it as *Var.* Donaldi, and gives *Kala tekar*, as its Marathi name. He says the 'Safed tekar' is used in native medicine, but not the 'Kala tekar,' which is distinguished by the following characteristics:—Leaves attaining 3·25″ (while those of 'safed tekar' only reach 1·75″), glabrous, membranous, with a cuneate base (type pubescent on both sides). Calyx ·25″ in flower and enlarged calyx as long as lobes of fruit only, which is ·3″ long (in 'safed tekar' the sepals are acuminate and are at least ·12″ longer than the fruit), glabrous, deltoid apiculate. Corolla ·75″ long (The Indian Forester, Aug., 1914, p. 402).

Uses : - In Bombay, the root is used as a bitter tonic, and is given in the convalescence of measles (S. Arjun). In Southern India, the juice of the leaves is given in neglected syphilitic complaints in doses of half an ounce or more twice daily (Ainslie). The Santals rub the plant over their bodies in dropsy and give it to their cattle to cure them of diarrhœa and worms or when the stomach swells (Campbell).

964. *C. serratum*, *Spreng.* H.F.B.I., IV. 592.

Syn. :—Volkameria serrata, *Linn.* Roxb 479.

Sans. :—Barbara

Vern. :—Barangi (H.) ; Ban-bakri (Jaunsar) ; Chúa (Nepal) ; Yi (Lepcha); Chirudekku (Tam.) ; Brahmari mari (Tel.) ; Bharang, bharangi or Bhángrá (Bomb.) ; Bháranga-mula, mula-root (Mar.) ; Bharungi Guz.).

Habitat :- -From the Himalaya, east of the Sutlej to Ceylon ; frequent ; very common in Bengal, also in Thana and Ratnagiri Districts.

A handsome shrub. Stem 4-8 ft. slightly branched, quadrangular. Bark yellow. Rootstock woody thick, perennial annually shooting up fresh herbaceous stems. Youngest shoots and inflorescence pubescent, (Brandis) Young parts glabrous, says Trimen from Ceylon. Leaves large 4-8 in., passing bracts above, oval ovate-oval acute at both ends, very coarsely and sharply serrate, glabrous, petiole very short stout Flowers large on short stout compressed, pubescent, deflexed pedicels. Cymes numerous, lax, pubescent, dichotomous, with a pair of acute bracts at each branching and a flower in the fork, each in axil of a large leafy bract, and collectively forming a long, lax, terminal erect panicle 6-10in long. Calyx $\frac{1}{6}$in. long, cup-shaped, puberulous, segments very short broadly triangular, ciliolate Corolla-tube short, $\frac{1}{4}$-$\frac{3}{8}$in , somewhat inflated, oblique at mouth, upper and lateral lobes $\frac{1}{2}$in., broadly oval, flat, spreading, lowest one (lip) $\frac{1}{4}$in. long, very concave deflexed ; filaments much curved, hairy at base Fruit a drupe about $\frac{1}{4}$in. long, depressed, somewhat succulent, normally 4-lobed, with a pyrene in each lobe (1-3 often suppressed). The leaves have a faint scent Corolla with posterior and lateral lobes pale-blue, anterior one dark bluish-purplish (Trimen). Fruit purple black (C. B. Clarke). Flowers bluish white, fruit black (Kanjilal).

Uses :—The root is used by natives in febrile and catarrhal affections (*Ph. Ind.*). It is said to be good in malarial fevers by the people of Ratnagiri where the tender leaves are eaten also as vegetable by the power classes of Hindus (K.R. Kirtikar).

Leaves boiled with oil and butter made into an ointment useful in cephalalgia and ophthalmia. The seeds bruised and boiled in butter milk used as aperient and in dropsy (Drury).

The authors of the *Pharmacographia Indica* write :—

" From enquiries we have made there is no doubt that this plant is largely used in many parts of India as a substitute for *Premna herbacea*, the true Gantu Bhárangi, but if we regard the root of *C. serratum* as the true Bhárangi, and the root of *P. herbacea* as the Gantu (or knotted Bhárangi,)

there will be no confusion. *C. serratum* has a light-coloured root, very often contorted, and seldom more than an inch in diameter. A light brown epidermis and thin bark cover the tough woody portion, which shows well-marked medullary rays and concentric rings. The drug contains much starch, it is faintly bitter, and has no peculiar odour. The young tops and light blue flowers are used as a vegetable by the natives

The root of *C. serratum* did not yield anything of great activity when examined chemically, which proves that there is little to recommend it as a medical agent.'

965. *C. infortunatum*, *Gaertn.*, H.F.B.I., IV. 594.

Syn. —Volkameria infortunata, *Roxb.* 178.

Vern.:—Bhant, bhat (Hind.), Chitu (Nepal); Kadung (Lepcha); Lukunah (Mechi); Khaoung-gyee (Burm.); Peragoo (Mal.); Barangi (Punj.), Bakada (Tel.); Karu (Dehra Dun).

Habitat:—Very common in the warm region throughout India, from Garhwal and Assam to Ceylon

A shrub or small slender tree often gregarious 4-10ft. branchlets bluntly quadrangular, yellowish or white villous silky pubescent upwards Petioles, underside of leaves inflorescence slightly pubescent Leaves large, 4-6in., ovate, cordate or rounded at base, acuminate, acute or sub-acute, entire, thinly hairy on both sides, especially on the veins beneath, somewhat 3-nerved from base, venation prominent beneath Petiole 1½-3in., Cylindric, pubescent Flowers large, white pink-tinged, on rather long pedicels, cymes stalked, in large lax, pyramidal pubescent panicles. Bracts leafy, deciduous. Calyx ½in., silky pubescent, very much enlarged in fruit, segments deep, lanceolate, very acute. Corolla-tube about 1in., slender, lobes, large, ½in., oblong, obtuse. Drupe ½in. nearly globose, succulent, purplish black, shining, seated in centre of the very much enlarged, spreading, succulent bright pink Calyx, 1½in. diam., pyrene usually solitary brittle (Trimen).

Uses:—"Dr. Bholanauth Bose calls attention to the leaves as a cheap and efficient substitute for *chiretta* as a *tonic and antiperiodic*. The fresh juice of the leaves is stated by Mr. Kanny Lall Dey to be employed by the natives as a vermifuge, and also as a bitter tonic and febrifuge in malarious fevers, especially in those of children" (Ph. Ind.). The leaves and

root are employed externally for tumors and certain skin diseases (Ph. J. July 25, 1885, p. 87). The bark is also employed by Indian and Arabian physicians (Balfour). "The expressed juice is an excellent laxative, cholagogue and anthelmintic. It is used as an injection into the rectum in cases of ascarides. It is also a valuable bitter tonic, and the natives believe that its presence cures scabies in the locality" (Dr. Thornton, in Watt's Dictionary).

Chemical composition Approximate analysis of the leaves gave the following result:—

Ethereal extract ..	10 81
Alcoholic „ ..	16 40
Aqueous „	15 20
Alkaline „	8·97
Organic residue ..	38·47
Inorganic „	5·93
Moisture	4·22
Total ..	100·00
Ash soluble in water	16 83
„ „ in acid	72·86
Sand and silicates . ..	10·30
Total .	100·00
Sodium chloride in ash	5 58

The leaves of C inforunatum yielded no volatile constituent when boiled with water. The ether extract contained a quantity of resinous matter, and gave up the bitter principles when heated with water; the extract was of a less fatty consistence than that from the C. inerme leaves. The spiritnous extract was also much larger than in the previous sample, and was differently constituted, inasmuch as it almost entirely consisted of a tannin, giving a green colour with ferric chloride. These leaves contain much more soluble organic matter than the former, but the percentage composition of the ash shows that the soluble inorganic salts are much smaller. The ash of these leaves amounted to 12 3 per cent (Hooper, in Pharm. Record, Aug 1st, 1888).

966. *C. siphonanthus, Br.*, H.F.B.I., IV. 595.

Syn. :—Siphonanthus indica, *Willd* Roxb. 481.

Sans. :—Brahma yastika.

Vern. :—Barangi; Arnah and Arni (H.); Bamanhati (B.); Arni, dawá-i-mubarak, arnah (Pb.); Bhârangî (Bomb.); Sarum enter (Dec.).

Habitat :—From Sikkim and Assam to Tenasserim frequent, Mts. of S. Deccan Peninsula ; Kumaon, wild.

A glabrous shrub 4-8ft., branches virgate. Stems herbaceous, fluted, hollow. Leaves in whorls of 3-5, 6-9 by 1-1½in., narrow lanceolate, subentire glabrous, rather hard, base tapering. Petiole 0-$\frac{1}{6}$in. Flowers white, fading into yellow, in rigid terminal panicles, 9-18in. long. Pedicels ½-1½in. Calyx ⅛in. long, divided $\frac{3}{4}$ way down dark red and enlarged in fruit. Segments oblong, acute. Corolla-tube 3-4 by $\frac{1}{10}$in., drooping ; lobes ½-⅔in., oblong-ovate. Corolla glabrous, white. Drupe ovoid, dark-blue, about ½in. long, supported by the spreading red Calyx.

Uses :—" The root considered useful in asthma, cough and scrofulous affections " (Dutt). The wood is slightly bitter and astringent and the resin employed in syphilitic rheumatism (Baden-Powell). The expressed juice of the leaves and tender branches is used with *ghî*, as an application in herpetic eruptions and pemphigus. The branches cut into small pieces and threaded like beads, are put on the necks of children suffering from these diseases as a charm, and it is believed by the natives that the smell of this plant is sufficient to cure these diseases (Dr. Thornton, in Watt's Dictionary).

967. *Avicennia officinalis, Linn.*, H.F.B.I, IV. 604.

Syn. :—A. tomentosa, *Vacy.* Roxb. 487.

Vern. :—Bina (B. and H.) ; Timmer, cheria (Sind) ; Tivar (M.) ; Nalla-mada, Mada-chettu (Tel.) ; Upputti (Mal.)

Habitat :—Common in the mangrove swamps of the Deccan Peninsula. Also in the swamps near Bombay and Kurla. (K.R.K.)

A large evergreen shrub or tree attaining 20ft., and a great girth, found in salt marshes, coast and tidal forests of India, Ceylon, Burma, the Andaman and Nicobar Islands and Sundarbans, often gregarious. " This tree, like other mangroves," says Gamble, " has the property of sending out very numerous

leafless blind root suckers which are believed to assist in respiration in the same way as lenticels do." Sometimes the suckers produce leaves and grow up into bushes. Bark greyish-brown, thin. Wood brown or grey, hard, in alternate layers of pore-bearing tissue and loose large-celled tissue without pores. The former layer shows the large moderate-sized or small pores in radial strings of 1 to 5 between the fine short medullary rays; the latter is much narrower and darker, forming belts which occasionally join each other, so that the layers are clearly not annual growth (Gamble). Branchlets, petiols underside of leaves and inflorescence clothed with a dense white silvery tomentum of very minute hairs. Leaves obovate or elliptic-obtuse, $3\frac{1}{2}$ by $1\frac{1}{2}$., base tapering, at times glabrate beneath. Flowers yellow, sessile, in bracteate heads (contracted cymes) which are arranged in trichotomous corymbs. Calyx $\frac{1}{8}$in., minutely pubescent, divided to the base into 5 imbricate sepals, corolla tubular glabrate, $\frac{1}{4}$in. lobes, 4 ovate acute or one lobe shortly bifid or lobes 5, subequal (not rarely all forms on one bush). Stamens 4, in the throat of the tube, another cells parallel. Ovary hairy, imperfectly 4-celled, ovules 4, suspended from a central 4-winged placenta, style short, distinct, sometimes as long as the ovary. Capsule 1in., compressed, dehiscing into two thick valves. Seed one, cotyledons large, folded lengthwise, hypocotyl (radicle) villous; the seed often germinates before it falls (Brandis).

Uses :—The roots possess aphrodisiac properties. The unripe seeds are used as poultice to hasten suppuration of boils and abscesses. It is used for small-pox in Madras. "The bark is astringent" (Watt's Dict. I. 361.)

—

N. O. LABIATÆ.

968. *Ocimum canum*, *Sims.*, H.F.B.I., IV. 607; Roxb. 463 (under *O. album*).

Sans. :—Âjaka, gambhiram, tiksṇamânu gandhapaṇirjjak.

Vern. :—Bharbhari (Santal); Kukka tulasi (Tel.); Ganjam-korai (Tam.); Nâyitulasi, Râmatulasi (Kan.); Kâṭṭu-ramatulasi (Mal.).