fleshy, linear or linear-cuneate or obtuse, sessile, up to ½in. long, turbinate, crowded at the ends and in the forks of the branches, sub-sessile, with 2 small leaves at the base of the pedicel; lobes short, hairy; glands transversely ovate, punctate; bracteoles very numerous, lacerate. Capsules ¼in. long, darkbrown, deeply 3-lobed, villous; cocci compressed, velvety. Seeds ovoid, smooth.

Uses:—The fresh milky juice of *E. Tirucalli* is said to be an effectual application for the removal of warts, and, incorporated with any bland oil, is used in common with the milky juice of other species as a rubefacient embrocation in rheumatism. The inspissated milky juice formerly enjoyed great repute in India as an antisyphilitic (*Ives' Voyage to India*, p. 462, and *Sonnerat Voyage*, vol. i, p. 146), and Dr. J Shortt reports having found it an excellent alterative in these cases in doses of five grains night and morning (Ph. Ind.)

In the Concan 1 to 4 drops of the milky juice are given with treacle or the flour of *Cicer Arietinum* as a purge, and the charcoal, which is very light, is used in making pastilles. Dr. G. Y. Hunter speaks of the juice as a good application in neuralgia. (Dymock)

1117. *E. neriifolia*, *Linn.*, H.F.B.I., v. 255.

Syn.:—E. ligularia, Roxb 391

Sans.:—Snuhi; Vajri; Schunda.

Vern.:—Sehund, kutte ki jibh ki send va patta, thohar, sij (H.); Mansa sij (B.); Gangichû (Pb.); Nivadunga, minaguta, (Mar); thohur (Sind); Ilaik-kalli (Tam); Aku-jemudu (Tel.); Yalekalli (Kan.)

Habitat:—Deccan Peninsula; common in rocky places; cultivated in Bengal and elsewhere in native villages.

A small, erect, fleshy, glabrous tree, armed at the nodes with a pair of sharp spines, ⅓-½in. long Bark reticulated; pith large, round. Wood white, soft, even-grained. "Stems cylindric, branches round, but the nodes arranged in 5 more or less spirally twisted ribs; branchlets 5-angled. Leaves few, deciduous, 6-12in. long, terminal on the branches, waved, narrowed

into a very short petiole, cuneate or oblanceolate, usually acute or mucronate. Involucres yellowish, in small, compact, shortly pedunculate, dichotomous cymes from the sinus between the nodes; lobes large, erect, roundish, cordate, fimbriate. Styles connate, high up, undivided; stigmas capitate. Capsule about ½in. broad, deeply 3-lobed. Cocci compressed, glabrous.

Uses:—The root enjoys repute as a remedy in snake bites, but there is no reliable evidence of its utility in these cases The expressed juice of the leaves is reported to prove very effectual in relieving the paroxysms of spasmodic asthma. (Ph. Ind.)

In Hindu medicine, the milky juice is considered purgative and rubefacient. As a purgative it is generally used in combination with other medicines which are steeped in it. Chebulic myrobalan, long pepper, *tivrit* root, etc., are thus treated and administered as drastic purgatives in ascites, anasarca and tympanites. It enters into the composition of several compound prescriptions of a drastic character (Dutt) "The juice is employed in ear-ache and, mixed with soot, in ophthalmia as an *anjan*' (T. N. Ghose, in Watt's Dic.).

Hemaglutinins (rabbit blood) were found in 26 of 47 Types of *Euphorbia* examined. The agglutinating action on different bloods (pigeon, rabbit, guinea pig, rat, sheep, goat) differed The active substance of *Euphorbia neriifolia* is fairly resistant to boiling. When hemaglutinins are contained in the vegetative parts of the plant they can be absent from the seeds and *vice versâ*. (Ch. Abs 10th Jan. 1913 p. 104.)

1118. *E. nivulia, Lam.*, H.F.B.I., V. 255.

Syn.:—E. neriifolia, Roxb 392

Vern.:—Thohar (H.); Shij (B.); Newian (Mar.); Ellaculli (Mal.); Elakullie (Tam); Akoo-jemoodoo (Tel.)

Habitat:—N.-W. Himalaya; on dry rocky hills. Guzerat, the Deccan Peninsula and Sindh.

A large shrub or tree, 20-25ft. Branches in whorls of four, fleshy, nearly cylindric, with vertically or spirally arranged tubercles, each supporting a pair of stipular prickles. Leafless in cold and dry season. Leaves alternate, 6 12in. long, ovate-oblong or linear; tip rounded; midrib much elevated beneath;

lateral nerves indistinct. Involucres 3 together, central sessile with male flowers, lateral, pedunculate with only male or both male and female flowers; lobes fimbriate, erect, ovate. Bracteoles many. Capsule $\frac{1}{3}$in. diam. Seeds smooth. (Kanjilal.)

Uses:—The juice of the leaves used internally as a purgative; mixed with *nim* oil externally applied in rheumatism. On the Western Coast bark of the root boiled in rice water and *arrack* given in dropsy. Leaves, simply warmed in the fire, will promote urine, externally applied, while their juice warmed is a good remedy in ear-ache and occasionally rubbed over the eyes to remove dimness of sight. (Ainslie and Rheede.) The pulp of the stem, mixed with green ginger given to persons bitten with mad dogs, previous to the appearance of hydrophobia. (*Journ. Agri-Horti. Soc.* X 37.) Horsfield (*Asiat. Journ.*, vol. vii, p. 265) mentions a case of dropsy in which he prescribed the inspissated juice of *E. Nivulia* in doses of a few ?) grains as a diuretic, and states that it was productive of evident relief. (*Ph. Ind.*)

Chem. Comp.—The dried juice contains 35 per cent. of Euphorbon, 25·40 per cent. of resin soluble in ether, 13·70 of resin insoluble in ether, 1·50 per cent. of caoutchouc, and the other constituents of commercial gum euphorbium. The dried juice of E. Tirucalli was also found to be of a similar nature, and to contain 4 per cent. of caoutchouc. Henke examined the juice of sixteen species of Euphorbia and ascertained that they all contain euphorbon, so that we may fairly suppose it, as well as an acid resin, malate of calcium, and caoutchouc, to be a constant constituent of the milky juice of all the plants belonging to the genus. (*Archiv. d. Pharm.* Vol. 224, 729-759.)

1119. *E. antiquorum*, *Linn.*, H.F.B.I., V. 255; Roxb. 390.

Sans:—Sihunda, vajra, vajrakantaka.

Vern.:—Tindhâra sehund, tidhâra-sehur (H.); Narasij, tekâtâsij, bâjbâran, lariya-dâona (B.); Etkee' (Sant.); Dokânâ-siju (Uriya); Shidu (Michi); Naraseja (Mar.); Tandhâri-send (Guz.); Shadhurak-kalli, tirikalli (Tam.); Bomma jemudu, bontachemudu (Tel.); mudu, mula-jemudu (Kan.); Katak-kalli (Mal.).

Habitat:—Throughout the hotter parts of India in dry places.

A polymorphous plant (Wight), attaining 25ft. (Kurz), 15-30ft. (Trimen). Trunk stout, often 3ft. or more in circum-

ference, cylindric or fluted. Bark thick, very rough and corrugated, brown. Branches numerous, curving upward, young whorled, stout, fleshy, green, jointed with 3 very wide, thick wings, which are narrowed to either end in each joint, and very coarsely repand-crenate. Leaves very small, ¼-½in., sessile on summit of each crenation, cuneate, truncate, glabrous, fleshy, almost nerveless, soon falling. Stipullary spines short, sharp divaricate, persistent; flower-heads in small, shortly stalked cymes of 3, the central, sessile, the 2 lateral on long, stout pedicels Bracts opposite, obovate Bracteoles abundant, fimbriate. Involucre-glands 5; very large, much broader than long, yellow, fleshy. Male flowers (stam.) numerous, mixed with many laciniate branchlets; female flowers:—ovary, nearly sessile; styles combined, for half their length; capsule 3-lobed, rather depressed; lobes ovoid, slightly compressed. Flowers greenish-yellow or pink. Usually appears leafless, as the small, fleshy leaves are quickly deciduous; contains abundance of pith in the centre; and the whole plant contains a very viscous, acrid, milky juice.

Uses:—A plaster, prepared from the roots and mixed with asafœtida, is applied externally to the stomachs of children suffering from worms. The bark of the root is purgative, and the stem is given in decoction in gout (Wight and Rheede). The juice, which flows from the branches, is used as a purgative to relieve pain in the loins. It is an acrid irritant in rheumatism and tooth-ache When taken internally, it acts as a drastic purgative. It is also employed in nervine diseases, dropsy, palsy, deafness and amaurosis (Baden-Powell). A preparation from this plant is in Chutia Nagpur given as a cure for cough (Revd. A. Campbell).

In the Nighantas the plants are described as purgative, pungent, digestive, bitter and heavy, and are said to be useful in constipation, flatulent distention, tumours, swellings, abdominal enlargements, rheumatism, spleen, leprosy, mania and jaundice.

They abound in an acrid milky juice, which is a popular application to warts and other cutaneous affections. The native doctors purify arsenious acid by packing it in a hole made

in a piece of the stem, closing the hole and exposing the stem to the action of fire until it is charred. The milky juice of *E. neriifolia* is usually administered internally by soaking other purgatives and aromatics in it, so that by absorption of the juice their purgative properties become increased A similar method is adopted when the juice is applied externally, a tent or issue pea being prepared with some finely powdered drug and steeped in it. Ainslie tells us that the native practitioners prescribe the juice as a purge and deobstruent, in those visceral obstructions and dropsical affections which are consequent of long-continued intermittent fever, the quantity given for a dose being about ¼ of a pagoda weight (20 grs.). Externally, mixed with margosa oil, it is applied to limbs which have become contracted from rheumatism. (*Mat. Ind*., Vol. II, p. 97.) In Bombay the root is mixed with country liquor to make it more intoxicating, and the juice is used to kill maggots in wounds, and is dropped into the ear to cure earache, a practice common to many parts of India. In the Concan the stem is roasted in ashes, and the expressed juice, with honey and borax, given in small doses to promote the expectoration of phlegm; sometimes the juice of *Adulsa* is added. For asthma, *Mudar* flowers, *Aghada* root, and *Gokaran* root are steeped in the juice, powdered and given with honey and chebulic myrobalans Dose about 4 grains. The author of the *Makhzan-ul-Adwiya*, under the name of Zakûm (Euphorbia), describes four Indian species, which are probably *E. antiquorum*. *E. neriifolia*, *E. Nivulia* and *E Tirucalli*. The milky juice of the first, he says, is mixed with the flour of *Cicer arietinum*, roasted, and administered in pills as a remedy for gonorrhœa. It has a strong purgative action. (Dymock.)

1120. *E. royleana*, *Boiss.*, H.F.B.I., V. 257.

Vern :– Shakar pitan, thar (Pb.); Sali, chula, shún, chu, duro (Himalayan names); Sihund (Kumaon); Afarbioon (Sind).

Habitat :—Outer Himalaya, in dry hilly tracts from Kumaon to the Jhelum. Salt Range.

A small tree with fleshy branches. Wood soft, white, spongy. Attains, 15-16ft., and has a girth up to 6ft. Branches with 5, sometimes 7, broad, flat faces, separated by sharp undulating

angles; spines in pair at the nodes. Leaves few or wanting. Involucres ½in. diam., yellow or green-yellow, hemispheric, in compact sessile, 3-fid cymes, from the sinus between the nodes; styles free nearly to the base. Cocci compressed, glabrous. Capsule ¾in. diam

Use:—The acrid, milky juice possesses cathartic and anthelmintic properties (Watt).

1121. *E. Thompsoniana*, *Boiss.*, H.F.B.I., V., 260.

Vern:—Hirtiz (Kashmir).

Habitat:—Western Tibet, Leh and Gilgit.

Perennial herb, quite glabrous. Stems a foot high, simple, sparingly leafy, from a stout perennial stock, unbranched, scaly at the base. Leaves ½-¾in., or even ¾-1½in. broad, coriaceous, dull yellow when dry, upper and under surface alike; sessile elliptic or ovate-obtuse or sub-acute; nerves few, obscure, ascending, floral, broader, involucral, 2 sub-orbicular. Rays 3-6, longer than the floral leaves. Involucres campanulate, glabrous, without, with 4 hairy lines within; ⅛in. broad; lobes small, fimbriate; styles long, slender; glands sub-stipitate, transversely oblong Capsule shortly stipitate, ⅓in. long, ¼in. diam.; cocci not separate by a deep sulcus, oblong. Seeds smooth, pale, oblong, ⅛in long; caruncle small, peltate. A very distinct species.

Uses:—The crushed root-stocks are employed by the natives of Kuram as detergents for washing the hair, and, when boiled, are given as purgatives (Aitchison)

In Kashmir, the root-stock is employed to adulterate '*kut*" (Saussurea Lappa) and is called by the Kashmiris "Hirtiz." The stem, root and leaves are said to be used medicinally. (Aitchison).

1122. *E. helioscopia*, *Linn.*, H.F.B.I., V. 262.

Vern.:—Hirruseeah; Mahabi (H); Gandabuti, dudai, kulfa-dodak, chatriwal (Pb.).

Habitat:—Throughout the Punjab plains and the Siwalik tract, ascending to 7,000 feet in the outer Himalaya. Introduced into the Nilghiri hills.

An erect annual, dichotomously branched above. Stem often very stout and copiously umbellately branched above, with divaricate branches. Leaves 2in. long and under, membranous, alternate, shortly petioled, obovate or spathulate, serrulate ; floral large, similar ; involucral, orbicular or oblong, 2-4, small. Involucre $\frac{1}{10}$in. diam., glabrous ; lobes, turbinate, small, oblong ; glands reniform, fimbriate. Capsule smooth, globose, $\frac{1}{8}$in diam. ; cocci round at back. Seeds deeply reticulated, pitted, turgidly oblong or sub-globose.

Uses :—The milky juice is applied to eruptions, and the seeds are given with roasted pepper in cholera (Honnigberger). The juice is also used in the form of a liniment in neuralgia and rheumatism, and the root is employed as an anthelmintic (Murray). It is used as a hydragogue cathartic, and the juice is applied to remove warts. Dr. Bandry has reported a case of severe ulceration resulting from the application of a poultice of the bruised plant. (Dymock.)

1123. E. *dracunculoides*, *Lamk.*, II.F.B.I., V. 262 ; Roxb. 390

Vern :—Richni, sudáb (the fruit), Kangi (the plant) (Pb.) ; Jy-chee, Chi agul-puputi (B.) ; Parwa (Santal) ; Tilla kâda (Tel.).

Habitat :—From the Punjab to Behar in the plains and low hills, and southward to Canara and Coromandel.

An annual. Stems erect, many from the root leafy, 12-18in. high, often extensively branched dichotomously ; branches divaricate. Leaves sessile, linear-lanceolate, sub-acute, rarely rounded, or sub-cordate, 1-1½in. long, involucral, shorter 2, broader at the base. Involucres solitary, hairy within, turbinate ; lobes ovate, ciliolate ; glands semi-lunate ; styles short, free. Capsule smooth, $\frac{1}{8}$-$\frac{1}{6}$in. diam., hardly depressed. Seeds oblong with a white tuberculate testa.

Use :—The fruit is officinal and used to remove warts (Watt).

The seeds yield a limpid, clear, yellowish or greenish-yellow oil, used as a drying oil and for burning. In 1848 it was pronounced in London to be as valuable as linseed oil. It is only used locally. (*Agric. Ledg., 1911-12*, No. 5.)

1124. *Buxus sempervirens, Linn.*, H.F.B.I., V. 267.

Vern :—Shanda laghuue (Afg.); Chikri (Kashmir); Papri, papur, paprang, shamshád, shumaj (Pb.).

Habitat :—Temperate Himalaya, from Kumaon to Simla and Bhotan. Punjab on the Salt Range, etc.

A small, evergreen shrub or tree. Bark grey, soft, corky, cut into small plates by deep horizontal and vertical cracks. Wood yellowish-white, hard, smooth, very close-and even-grained. Branchlets and young leaves pubescent. Branchlets 4-sided. Leaves opposite, coriaceous, varying from lanceolate to ovate, quite entire, 1-3in. long, narrowed into a short petiole. Flowers yellowish, monœcious, in dense, short, axillary spikes; smell unpleasant; the terminal flowers usually female Male flowers :—Sepals 4, biseriate, imbricate; stamens 4 free, opposite to sepals, inserted round a 4-sided rudimentary ovary. Female flowers :—Sepals 6, in two circles of 3 each; ovary 3-celled, 3-cornered; top flat; the corners terminating in thick, short styles. Capsules coriaceous, 3-valved, each valve ending in 2 horns, being the halves of 2 styles; dissepiments attached to the valves. (Brandis); seeds oblong, trigonous, with a black shining testa and fleshy albumen.

Uses :—The wood is diaphoretic; leaves bitter, purgative and diaphoretic, useful in rheumatism and syphilis. Said to be poisonous to camels A tincture from the bark is used as a febrifuge (Stewart).

1125. *Bridelia retusa Spreng.*, H F B.I., V. 268.

Syn. :—B. spinosa, *Roxb.* 706.

Vern. :—Pathor, mark (Pb.); Khâja, kâj, kassi, gauli (H); Kharaka, kaka (Kol.); Kûj (Mongyr); Kadrû pala (Santal); Gaya (Dehra Dun); Gauli (Garhwal); Lamkana, augnera (Rajputana); Geio (Nepal); Pengji (Lepcha); Kashi (Garo); Kamkûi (Chittagong); Kasi, kosi (Uriya); Mulluvengay, kamanji (Tam.); Kormânu, pedda-âvem, danki-bura, dudi mâddi, kora madi, (Tel.); Kassei (Gond.); Gûnjan, kati ain, asána (Bhil); Phatarphod, asana, asauna (Bom.); Sun (Duk.); Asuna, goje (Kan.); Adamarathu (Tinnevelly).

Habitat :—Throughout the hotter parts of India, along the foot of the Himalaya from Kashmir to Mishmi.

A deciduous tree, 50-60ft., with thorns on the back of young stems. Bark ¼in. thick, grey or brown, rough with longitudinal cracks and exfoliating in long irregular plates Wood moderately hard to hard, grey to olive-brown, close-grained ; seasons well.

Leaves coriaceous, elliptic-oblong, ovate or obovate, acute, obtuse or rounded at the apex, the base usually rounded, bright-green and glabrous on the upper surface and turning pinkish-purple before falling, often finely tomentose beneath ; main lateral nerves 15-25 pairs, straight, prominent, finely reticulate between ; petioles ¼-½in long, stipules ovate-lanceolate, unequal at the base, deciduous. Flowers dioecious, greenish-yellow, sessile or shortly pedicelled, arranged in dense axillary clusters or in long axillary or terminal panicled spikes exceeding the leaves, bracts small, obtuse, villous Calyx ⅛in. in diam ; lobes fleshy, spreading, triangular-ovate, acute, glabrous and often tinged with red ; tube pubescent. Petals of males obovate, pectinate ; of the females subspathulate. Disk of male flower thick and pulpy ; of the female truncate, enclosing the ovary. Drupe fleshy, subglobose, ½in. in diam., seated on the persistent hardly enlarged calyx, flesh-coloured or purplish-black when quite ripe. (Duthie)

Uses :—The bark is a strong astringent and is used in Western India as a lithontriptic (Dymock) Used as a liniment with gingelly oil in rheumatism (Surg.-Major Ratton in Watt's Dictionary). Root astringent (J. J. Wood's Plants of Chutia Nagpur, p. 135).

Chemical composition.—The bark afforded 41·7 per cent. of water extract, containing 39·9 parts of tannic acid. The tannic acid gave a greyish-green precipitate with plumbic acetate, and a blue-black colour with ferric chloride. The air-dried bark left 7·35 per cent. of ash on incineration. Although this is one of the most astringent barks in India, it does not appear to be known to, or used by, Europeans in the arts.

1126. *B. montana, Willd.*, H.F.B.I. v. 269, Roxb. 705.

Vern. :—Kargnalia, khaja, geia, kusi (H.) ; Gondni (Saharanpur) ; Geio (Nepal) ; Kaisho (Ass.) ; Kurgnulia (Kumaon) ;

Asáná (Mar. and Cutch); Asano (Bom. and Guz.); Faturfoda (Goa); Vengemaram, venge (Tam.); Gundebingula, pantangi, áuem (Tel.).

Habitat:—Along the foot-hills of the Himalaya, from the Punjab to Bhotan; Khasia Mts., Behar on Parusnath; Coromandel.

A moderate-sized, grabrous deciduous tree. Wood grey, moderately hard, nearly glabrous. Branches often pustulate. Leaves membranous, very variable, 3-5in. long, obovate or broad elliptic, glabrous or shining above, paler beneath; lateral nerves 10-15 pair, more or less arched; cross nervules rather strong; petiole $\frac{1}{10}$-$\frac{1}{3}$in. long; stipules deciduous. Flowers monœious, says J.D. Hooker. But Rai Bahadur Upendranath Kanjilal says thus:—I have seen several trees with only male, and several others with only female flowers, and so far none with both" (Forest Flora, United Provinces, Siwalik and Jaunsar divisions, p. 346, foot-note, 1911, Calcutta). The flowers are small, greenish-yellow, shortly pedicelled; bracts many and crowded, membranous pubescent. Calyx $\frac{1}{10}$-$\frac{1}{5}$in. diam; lobes triangular-ovate, unaltered in fruit. Ovary enclosed in disk. Styles 2, 2-fid. Petals oblanceolate Fruit ovoid, $\frac{1}{5}$in. long, black when ripe, seated on the unaltered calyx. The fruits are not eaten, says Kanjilal.

Uses:—Reported to possess anthelmintic properties Much used in Bombay and Goa as an astringent medicine. (Watt.)

1127. *Cleistanthus collinus, Benth.*, H.F.B.I., V. 274.

Syn.:—Cluytia collina, *Roxb.* 704.

Vern.:—Woadugu maram (Tam); Kadishen, Korsi (Tel); Garrar, garári (H.); Karada (Uriya); Parasu, pas, pasu, larchuter (Kol.); Kargalli (Santal); Ghara (Berar); Garari (Mar.); Kergali (Karwar); Ganari (C. P.).

Habitat:—Dry hills in various parts of India from Simla to Behar, and southward to Central India, and the Deccan Peninsula.

A small, deciduous tree. Bark $\frac{1}{4}$in. thick, dark-brown, almost black, often with a reddish tinge, rough with numerous

cracks, exfoliating in rectangular woody scales. Wood dark, reddish-brown, tough, hard, close-grained; heartwood small. Branches spreading, rigid, twiggy, smooth or pustulate. Foliage bright-green. Leaves coriaceous, orbicular, broadly ovate or elliptic; tip rounded or retuse, glaucous beneath, 1¼-4 by 1½-3in., pale when dry, loosely reticulate, young, membranous and faintly pubescent beneath, old 4-8 pair, spreading, very slender; petiole ¼in. Flowers yellowish-green, in small axillary, silky clusters; calyx-lobes lanceolate, or ovate-lanceolate. Calyx ¼in. male, pulvinate, of female conical with a thick margin. Ovary quite glabrous, globose, styles free thick; stigmas fleshy, lobed Capsule ⅜in., obscurely 3-lobed, woody sessile; rarely 1-lobed, dark-brown, shining and wrinkled when dry, top not lobed. Seeds 3, ⅛in. diam, globose chestnut-brown; albumen scanty.

Uses :—The bark or outer crust of capsule said to be exceedingly poisonous (O'Shaughnessy.)

In Chutia Nagpur the fruit and bark are employed to poison fish; the latter is also considered a useful application in cutaneous diseases. For severe headache, the head and upper part of the body are bathed in water in which the leaves have been steeped (Revd. A. Campbell.) An extract of the leaves and fruit acts as a violent gastro-intestinal irritant.

1128. *Andrachne cordifolia, Muell.*, H.F.B.I., V. 283.

Vern. :—Kurkni, gurguli, kurkuli (Pb.).

Habitat :—Central and Western Temperate Himalaya, from Nepal westwards to Murree.

A small shrub with slender branches. Young shoots, petioles, and underside of leaves hairy. Wood white, moderately hard-grained. Leaves 1-2in. long, ovate-oblong, obtuse or mucronate, pale when dry, nerves very slender. Petiole filiform, ¼-¾in. Flowers ⅛in. diam., monœcious, axillary on long, filiform pedicels, ½-1½in long. Calyx segments obovate, acute, enlarged in fruit. Petioles keeled, spathulate; disk of 5 flat, bifid, membranous glands. Fruit ¼in. diam., depressed, globose,

supported by the enlarged calyx. Seeds broadly trigonous, dorsally rounded.

Use :—The twigs and leaves are said to kill cattle when browsed in the early morning on an empty stomach. (Stewart).

1129. *Phyllanthus reticulatus, Poir.*, H.F.B.I., V. 288, Roxb. 681.

Sans. :—Krishna-kamboji

Vern. :—Panjoli, mâkhi, buin-owla, kâle-madh-kâ-per (H.); Panjuli (B. and Pb.); Kabonan (Raj.); Kâmohi, fruit=pika-pirû, leaves=kâmohi jopun, bark=kâmohi jochodo (Sind); Pâvana (Bomb.); Datwan (Guz); Pulavayar-puttay, pillanji, karappu-pillânji (Tam.); Nalla-puruguddu, purugudu, nella-purudûdû, phulser (Tel.).

Habitat :—Throughout tropical India, in the plains from Sind, Behar, Rohilkund, Sikkim and Assam to Travancore.

A large straggling or climbing shrub, 8-10ft. Bark brown, thin. Wood reddish or greyish-white, hard, close-grained. Shoots glabrous or finely pubescent. Branches lenticillate, numerous, stout; woody branchlets long, drooping. Leaves 1-2in., oblong or elliptic, tip rounded, acute or obtuse; "variable," says Trimen, "lanceolate or oblong-lanceolate, nearly rotundate, glabrous or slightly pubescent, somewhat paler beneath;" nerves 6-8 pairs; slender. Petiole $\frac{1}{12}$-$\frac{1}{6}$in.; stipules small, subulate, persistent, hard. Flowers pink, solitary or several together on slender, axillary peduncles. Calyx-segments ovate, membranous, alternating with glands of the disk. Male flowers:—Stamens 5, filaments of the 3 inner longer, connate. Female flowers:—Ovary, 5-10-celled (Brandis), 4-5-celled (Trimen); styles short, minutely lobed; stigmas short; ovules 2 in each cell, superposed. Fruit a purple berry, sweetish when ripe, shining, smooth, depressed, globose. $\frac{1}{6}$-$\frac{1}{3}$in. diam., often racemose on leafless branches. Seeds 8-14, triquetrous, finely granulate, superposed in each cell, bluntly trigonous.

Uses :—The leaves are employed as a diuretic and cooling medicine in Sind. (Stocks.) The bark is considered alterative

and attenuant, and is prescribed in decoction in the quantity of four ounces or more twice daily. (Ainslie.) The juice of the leaves is used medicinally in the Konkan. It is made into a pill with camphor and cubebs, which is allowed to dissolve in the mouth as a remedy for bleeding from the gums, it is also reduced to a thin extract along with the juice of other alterative plants and made into a pill with aromatics. This pill is given twice a day, rubbed down in milk as an alterative in 'heat of the blood'. (Dymock.)

1130. *P. Emblica, Linn.*, H.F.B.I., v. 289; Roxb. 684.

Sans :—Dhâtriphala, Amritaphala, Amalakam, Shri-phalam, Sainam.

Vern. :—Aonlá, (H.); Ambliy (Arab.); Amelah (Pers.); Ambul, ambli (Pb.); Amla, àmlaki (B. and Ass.); Ambari (Garo); Neli, nellekai (Tam.); Shabju, zíphiyusí (Burm.); Anvala (Mar.).

Habitat :—Throughout Tropical India, wild or planted, from the base of the Himalaya, from Jummoo eastwards, and southwards to Ceylon.

A moderate-sized, deciduous, pretty and ornamental tree. Bark somewhat less than ½in., thick, light grey, exfoliating in irregular patches; inner substance red Wood red, hard, close-grained, warps and splits in seasoning; no heartwood Branchlets mostly deciduous, finely pubescent or glabrous. Foliage feathery, light green. Leaves equal and distichous, symmetrically close; set like the leaflets of a pinnate leaf, glabrous, puberulous beneath, ⅓-½in. long, sub-sessile, linear-oblong, acute or mucronate. Stipules minute, ovate, finely acute. Flowers apetalous, monœcious, greenish-yellow, in axillary clusters. Male flowers :—Numerous and shortly pedicillate; stamens 3, joined in a short column. Disk, of distinct glands, alternating with the calyx-segments, rarely O. Female-flowers few, sub-sessile. Sepals as in male. Disk cupular, lacerate. Ovary 3-celled, with 2 ovules in each cell; styles 3, connate at the base, twice bifid.

Fruit a capsule of three 2-valved cocci, ½-⅞in. diam., obscurely 6-lobed, globose, fleshy, pale-yellow, dehiscent when dry, sometimes reddish when ripe, acid, astringent, and bitterish, 3-celled, 6-seeded.

Uses :—The fresh juice is cooling, refrigerant, diuretic and laxative. The exudation from the incisions on the fruit is used as an external application in inflammation of the eye. (Dutt.)

In the fresh state they are round, of the size of a gall-nut, with six valves projecting externally ; pulp fleshy, acidulous, enveloping white angular seeds, and possessed of purgative properties. In the dry state they are roundish, sub-hexagonal, wrinkled, of a blackish-grey colour, slightly aromatic odour and acidulous *astringent* taste. In the latter state, they are employed in the process of tanning, and are highly valued as an astringent in bowel complaints. Bontius (*Diseases of India*, p. 200) testifies to their value in the treatment of diarrhœa and dysentery, in the hospitals of Batavia in his day. Antiscorbutic virtues have also been attributed to them by Dr. D. McNab (*Calcutta Med. Phys. Trans.*, vol. viii., and *Calcutta Quart. Med. Journ.* 1837, vol. i., p. 306) ; but Dr. Irvine (*Med. Topog. of Ajmeer*, p. 118) is of opinion that they do not possess any peculiar virtue in this respect, and that they are not superior to any other acid vegetable astringent. He mentions that they contain a large proportion of *gallic acid*. The flowers of this tree are employed by the Hindu doctors for their supposed refrigerant and *aperient qualities* (Ainslie, *Mat. Ind.*, vol. ii., p. 244). The bark partakes of the astringency of the ripe fruit Dr. E. Ross reports having prepared from the root, by decoction and evaporation, an astringent extract equal to catechu, both for medicinal purposes and in the arts ; he adds that chips of the wood or small branches thrown into impure or muddy water, clear it effectually ; hence the wood is much employed by the natives in making well rings. This point is worthy of further inquiry. (Ph. Ind.) In the Concan, the juice of the fresh bark, with honey and turmeric, is given in gonorrhœa. (Dymock.)

The leaves are, in Baroda, used as an infusion with fenugreek seeds in cases of chronic dysentery, and are also considered a bitter tonic. In the same locality the milky juice is considered a good application to offensive sores.

Chemical composition—The pulpy portion of the fruit dried at 100°C., and freed from the nuts, had the following composition :—

Ether extract (gallic acid &c.) ..	.. 11·32
Alcoholic extract (tannin, sugar, &c.) ..	.. 36·10
Aqueous extract (gum, &c.)	. 13·75
Soda extract (albumen, &c.)	... 13·08
Crude cellulose .	.. 17·80
Mineral matter	.. 4·12
Moisture and loss	.. 3 83
	100·00

The acidity of the fruit was found to be equal to 9·6 per cent, calculated as acetic acid. The amount of tannic acid, estimated with acetate of lead solution, was 35 per cent. and 10 per cent. of glucose was estimated by means of Fehling's solution on an infusion of the pulp after the removal of the tannin.

Löwe considers this tannin to be identical with the ellago-tannic acid of Divi-divi. (Pharmacogr. Ind. III 263.)

1131. *P. madraspatensis, Linn.*, H.F.B.I., V. 292; Roxb. 678.

Vern.—Nala usirekee (Tel.); Kánocha, hazarmani (H.).

Habitat—Drier parts of India; from Banda, throughout the Deccan Peninsula to Ceylon.

An annual herb, but sometimes very woody at base. Stem 1-3ft. erect, with long, slender, ascending, glabrous branches. Leaves on very short petioles, small, ¼-½in., cuneate-obovate, much tapering to narrower base, rounded truncate, but often apiculate at apex, glaucous and with lateral veins, conspicuous beneath. Stipules linear-lanceolate, very acute. Flowers on very short pedicels, male in small clusters, female solitary; sepals 6, obovate-rotundate, obtuse. Male flowers :—Stamens 3, filaments connate. Female flowers :—Styles 3, very small. Fruit dry, very small, under ⅛in., depressed, 3-lobed, glabrous. Seeds very finely muricate in lines. Disk of glands in both sexes. Anthers almost sessile on the column, erect, apiculate.

Use:—The leaves are used in infusion by the *Vaidyas* in Southern India as a remedy for headache. (Ainslie.)

When soaked in water the seeds immediately become thickly coated with a semi-opaque mucilage; the kernel is oily and has a sweet nutty taste; the seeds are used medicinally on account of the mucilage which they afford. (Pharmacogr. Ind. III. 265.)

1132. *P. urinaria, Linn.*, II.F.B.I., V. 293. Roxb. 680.

Sans. :—Tâmra-Valli.

Vern. :—Hazar munee (B. and H.); Yerra userekee (Tel.); Lâl-bhuin-ânvalah (H , Badar-zhapni (Santal); Shirappunelli (Tam.); Chiru-kizhukânelli, chukanna-kizhânelli (Mal.).

Habitat:—Throughout India, from the Punjab to Assam and Ceylon.

An annual low or tall, diffusely branched, erect or decumbent herb (becoming perennial in some soils), slender, glabrous. Leaf-bearing branchlets short, flattened or shortly winged, often tinged with red Leaves numerous, closely placed, distichously imbricate, nearly sessile, small ¼-⅓in., oblong, rounded at base, apiculate, paler or silvery beneath. Stipules peltate, very acute. Flowers yellowish, all the year round, numerous, very minute, nearly sessile, solitary. Sepals green, ciliolate, those of the male's sub-orbicular; of the females oblong, not enlarged in fruit. Fruit very small, scarcely ⅛in., depressed globose, scarcely lobed, muriculate or echinate. Seeds transversely furrowed. Styles with hooked arms. Filaments very shortly united. Anthers erect, didymous, not apiculate.

Use:—Medicinal properties similar to those of P. Niruri.

In Chutia Nagpur, the root is believed to be sudorific, being given to sleepless children along with *Zornia diphylla*. (Campbell.)

1133. *P. simplex, Retz.*, II.F.B.I., V. 295; Roxb. 678.

Vern.:—Tandî meral (Santal); Bhuiâvalî (Mar.); Uchchi usirika (Tel.).

Habitat :—Throughout India, in the plains and low hills, from Kumaon to Assam and southward to Travancore.

A perennial herb, often woody below, with a long tap-root and numerous, elongated, slender, prostrate or ascending slightly-branched, compressed, glabrous stems. Leaves numerous, small, ¼-½in., on very short petioles, closely placed and often overlapping, linear-oblong, obtuse, apiculate; stipules peltate, sagittate, brown, scarious. Flowers normally solitary on slender solitary pedicels; females larger; sepals oblong, obtuse; stamens 3, distinct; styles short, bifid. Fruit very small, under ⅛in., on somewhat enlarged sepals, globose, faintly 3-lobed, usually tubercled. (Trimen). Seeds minute, trigonous, rounded on the back, finely tubercled, dark-brown.

Var. :—*Oblongifolia.*—Stem erect, diffusely branched. Leaves ½-¾in. long, elliptic-oblong, sub-acute; female pedicels ⅛-¼in. Dekkan Peninsula and Ceylon (J. D. Hooker.) A very variable plant in habit.

Uses :—The natives use the fresh leaves, flowers and fruit, with cumin seeds and sugar, of each equal parts made into an electuary, for the cure of gonorrhœa, a teaspoonful is given twice a day. The fresh leaves, bruised and mixed with butter milk, make a wash to cure the itch in children. (Roxburgh).

The root is used in Chutia Nagpur as an external application for mammary abscess. (Campbell.)

1134. *P. Niruri, Linn.*, H.F.B.I., v. 298; Roxb. 680.

Sans. :—Bhudhâtri, Bahupatri, Amrita-Amlika, Shina.

Vern. .—Bhûin-anvalah (Hind. and Dec.); Kizhkây-nelli (Tam.); Néla-usirika (Tel.); Kizhâ-nelli (Mal.); Kiranelli-gidá (Kan.); Miziphiyu (Burm.); Bhui âvali (Bom.); Bhuiaola (Uriya); Niruri (Sind).

Habitat :—Throughout the hotter parts of India; from the Punjab to Assam; and southward to Travancore. A reddish petioled variety found wild and common in the Thana district. (K. R. K.)

An annual weedy herb, 6-18in. high, branched from the base, with an erect stem, naked below, and slender leafy, angular branches above, glabrous. Leaves numerous, crowded, distichous, somewhat imbricated, spreading, nearly sessile, $\frac{1}{2}$-$\frac{3}{4}$in., oblong-oval, obtuse thin, pale beneath. Stipules very acute. Male flowers:—sepals $\frac{1}{10}$in. long, rounded; stamens 3. Female flowers:—sepals oval, sub-acute, with broad, white margins. Fruit very small, $\frac{1}{16}$-$\frac{1}{12}$in., depressed globose, faintly 3-lobed, quite smooth. Seeds with slender ribs Flowers all the year, yellow (Trimen).

Uses:—The young shoots in infusion are given in dysentery. The leaves are stomachic. (Watt.) The juice of the stems mixed with oil employed in ophthalmia. Leaves and root pulverised and made into poultice with rice-water said to lessen œdematous swellings and ulcers. (Drury.) "The Rev. Dr. John informs me that he has known the fresh root prove an excellent remedy for the *jaundice*. About half an ounce, while fresh, was given, rubbed up in a cup of milk night and morning, the cure was completed in a few days without any sensible operation of the medicine." (Roxb.)

"Phyllanthus Niruri, *Linn.*, and P. urinaria, *Linn.*, two plants indigenous throughout India, are held in considerable repute by the natives as *diuretics*, and as such are much employed in *dropsical* affections, also in *gonorrhœa, and other genito-urinary affections*. They have been mentioned favourably by Horsfield and others, but they do not appear to possess any special claims to notice.

"The decoction of the root and leaves is very bitter and is a favourite remedy among the natives of Porto Rico, for the cure of intermittent fevers. I have myself many times proved its efficacy in preventing the expected paroxysm. I was accustomed to employ a tincture made by myself with the whole plant, the dose being two drachms in the morning. Sometimes I repeated the dose, which acted upon the bowels as a slight purgative and this is very useful in inveterate intermittents with infarcts of the spleen and liver. The infusion of the root and leaves is a good tonic, and a diuretic when taken cold in repeat-

ed doses." (Dr. A. J. Amadeo, in *Pharmaceut. Jour.* Ap. 28. 1888.)

According to Muhammadan writers, the milky juice is a good application to offensive sores; a poultice of the leaves with salt cures scabby affections, and without salt may be applied to bruises, etc. In the Konkan, the root rubbed down with rice water is given as a remedy for menorrhagia. (Dymock.)

Regarding the chemical composition of this and of *P. urinaria, Linn.*, the authors of the *Pharmacographia Indica* write :—

Chemical composition.—The alcoholic extract from the whole plant was mixed with water acidulated with sulphuric acid, and agitated first with petroleum ether, then with ether, and finally rendered alkaline and re-agitated with ether.

The petroleum ether extract was dark-coloured, and soft, with a tea-like odour, and extremely and persistently bitter. It was mixed with 3 per cent. caustic soda solution and re agitated with petroleum ether, which removed the bitter principle contaminated with traces of oil and colouring matter. This extract gave the euphorbon colour reaction when treated with sulphuric and nitric acids. For the bitter neutral principle, we propose the name of pseudochiratin.

The acid ether extract contained green colouring matter, and was partly soluble in water with acid re-action, the solution giving a dirty bluish-green coloration with ferric chloride, slightly precipitating gelatine, but affording no re-action with cyanide of potassium

The alkaline ether extract contained an alkaloidal principle, which, after purification, was obtained in white feathery crystals without any special taste. With Frohde's re-agent it gave a light yellowish-red coloration, changing to blue on heating; with concentrated nitric acid, yellowish. No re-action with dichromate of potassium and sulphuric acid.

1135. *P. distichus, Muell. Arg.*, H.F B.I., V. 301.

Syn. :—P. longifolious, *Jacq.* Rovb. 684.

Sans. :—Lavani.

Vern. :—Harfarauri, chalmeri (H); Noari, loda, fruit—hariphûl (B.); Narkulî (Uriya); Cherambola (Goa); Arunelli (Tam.); Râcha usirike (Tel.); Kirnelli (Kan.); Nelli (Malay).

Habitat :—In gardens throughout India.

A deciduous tree. Bark, says Gamble, grey; smooth, very rough, says J. D. Hooker. Wood light-brown, moderately hard, 20-30ft., quite glabrous; with very robust branches and slender leafy branchlets, 1-2ft., terete below, angular above, mostly

deciduous. Leaves rather membranous, pinnately distichous, 2-3in., petioled, obliquely ovate, acute, pale beneath; base usually rounded. Nerves 5-8 pair, arched. Petiole $\frac{1}{12}$-$\frac{1}{8}$in.; stipules toothed. Flowers brownish-red, minute, most densely clustered, $\frac{1}{16}$in. diam.; clusters axillary or in slender racemes from the thick, old branches, shortly pedicelled; occasionally 2-sexual, sometimes 3-4-merous; pedicels capillary, $\frac{1}{4}$-$\frac{1}{2}$in. Sepals 4, orbicular; filaments free. Disk of male, of large glands; of female, annular crenate. Stamens 4, recurved; anthers shortly oblong, slits lateral. Ovary ovoid; styles 3-4, reflexed from the contracted top, 2-partite; arms subulate, acute. Fruit globose, often crowded. Pericarp fleshy, acid, seed-lobed, generally 6-8 grooved. Endocarp 3-4-celled; parts 1-celled, 1-seeded.

Use:—The fruit is acid and astringent, the root is an active purgative, and the seed is also cathartic.

1136. *Flueggia microcarpa, Blume.*, H.F.B.I., V. 328.

Syn.:—Phyllanthus leucopyrus *Koen.*, Roxb., 679.

Vern.:—Parpo (Goa). Paudharphali, kánte puwan (Bomb). Dalme (H.); Rithoul (Dehra Dun).

Habitat:—The Punjab Plains. Deccan Peninsula, from Canara southwards.

A small, deciduous tree or large shrub. Bark smooth, thin, rusty or reddish-brown. Wood red, hard, close-grained. "A graceful little tree of slow growth," says Gamble. Glabrous, unarmed; branchlets slender, angled and compressed, marked with small, white specks. Branches straight and regularly fluted or angular. Leaves very variable, 1-4in. long, elliptic-ovate, obovate or orbicular, membranous, but tough, rather glaucous beneath; tip rounded, obtuse or acute, rarely acuminate or retuse; lateral nerves 6-8 pair, very slender; petiole $\frac{1}{10}$-$\frac{1}{3}$in., slender. Flowers dioecious, very small, pedicelled, usually in axillary fascicles. Sepals 5, imbricate. Male flowers:—Stamens 5, alternating with disk-glands, but opposite to the sepals; pastillode large, 3-fid. Female flowers:—Ovary, ovoid, on an annular disk; styles 3, 2-fid. Fruit of two sizes, mostly small and dry,

about $\frac{1}{10}$ $\frac{1}{6}$in. diam , with a few larger ones, $\frac{1}{3}$in. diam. which are white and fleshy ; seeds 3-6, punctate (Kanjilal).

Use :—The juice of the leaves, or the leaves made into a paste with tobacco, are used to destroy worms in sores. (Dymock.)

Chemical composition.—The bark contains 10 per cent. of a tannic acid, giving a violet-black colour with ferric chloride, and the mixture becomes red on the addition of ammonia. An alkaloid is also present, giving a purplish-red colour, afterwards turning to green, with Fröhde's re-agent, and a violet colour with strong sulphuric acid and permanganate of potassium. The alkaloid is soluble in excess of alkalies. The infusion was somewhat frothy, but no sapogenin could be isolated from it after boiling with acid.

1137. *Breynia rhamnoides, Muell., Arg.* H.F.B.I., v. 330.

Syn. :—Phyllanthus rhamnoides, *Willd.*

Sans. :—Aruni.

Vern. : – Surasaruni (H.), Tikkar (Oudh.)

Habitat :—Throughout tropical India, from Oudh eastwards to Upper Assam and southwards to Travancore.

A small tree or bush, quite glabrous, with many long horizontal, bifarious, flexous branches Bark yellowish-grey or greyish-brown, rough. Wood reddish, hard, close-grained. Twigs angular, glabrous. Leaves numerous, membranous, distichous, spreading on short petioles, 1-1½in., oval, acute at both ends, entire, glabrous, thin, pale beneath ; veins inconspicuous. Stipules minute, subulate. Flowers yellow, very small, on slender, filiform pedicels. Male flowers very small in clusters; female solitary. Male flowers :– Calyx turbinate ; segments short, obtuse, inflexed, nearly closing to mouth. Staminal column short. Female flowers :—Calyx cup-shaped, segments acute. Ovary much-exserted, oblong, truncate. Styles very short. Fruit small, globose, $\frac{1}{8}$in., seated on the scarcely enlarged calyx, smooth, dull-red. Seeds $\frac{1}{8}$in., aril 0 ; testa imperforate except at the very base.

Uses :—According to Ainslie, it was brought to Dr. F. Hamilton while in Behar as a medicine of some note; the dried leaves are smoked like tobacco, in cases in which the

uvula and tonsils are swelled. The bark is astringent. Further information upon the medicinal properties of this plant is wanted. (Dymock.)

1138. *Putranjiva Roxburghii. Wall.*, H.F.B.I., V. 336.

Syn. :—Nageia Putranjiva, *Roxb.* 716.

Sans :— Putra-jiva.

Vern. :—Jiaputa, joti, pútr-jiva, (H.) ; Putranjiva, jiáputa (B.) ; Pitoj (Sant.) ; Patajan, jiyaputra, seeds = jíapota ; leaves = pútrajívak (Pb.) ; Puta-jan, putra-jiva, jiv-putrak, jiwan-putr (Mar.) ; Karupali (Tam.) ; Kadrajuvi, kudrajinie, maháputra jívi yárala, kuduru juvir (Tel.) ; Pongalam (Mal).

Habitat :—Wild and cultivated throughout Tropical India, from the Lower Himalaya in Kumaon, eastwards and southwards to Pegu and Ceylon.

A handsome, evergreen, moderate-sized, tree generally with pendant branches. Branchlets slender, minutely pubescent ; petioles pubescent ; foliage dark-green. Bark dark-grey, whitish when young, with numerous horizontal oblong lenticels. Wood grey, moderately hard, close-grained. Leaves obliquely obovate or ovate lanceolate, serrulate, 2-3in., obtuse, acute or acuminate, coriaceous, shining, base unequal-sided. Main lateral nerves 8-10 pair, besides secondary nerves and reticalate veins. Petiole $\frac{1}{5}$-$\frac{3}{10}$in. long ; stipules subulate, deciduous. Disk 0. Male flowers short, pedicelled, in axillary clusters which are often spicate ; calyx 3-5 partite ; stamens 3 ; filaments free or connate at the base. Female flowers long, pedicelled, axillary, solitary or in twos or threes ; calyx 5-6-cleft, segments small, imbricate ; stamens 3, filaments more or less connate. Ovary tomentose, styles 3 ; stigmas crescent-shaped, fleshy. Fruit drupe, $\frac{1}{2}$in. long, ovoid or globose ; white tomentose on pedicels, $\frac{1}{2}$-in. long. Putamen hard, pointed, rugose ; seed one.

Uses :—The leaves and stones of the fruit are given in decoction in colds and fevers. (Stewart.)

The nuts are hung round the necks of children to keep them in good health. They are mentioned in the Nighantas as being

also Garbha-kara, "productive of impregnation," and medicinal properties are attributed to them. The hard wrinkled nuts are generally worn only as a charm, but are sometimes given internally in colds on account of their supposed heating properties, (Pharmacogr. Ind. III. 271.

The seeds yield a rather turbid oil of an olive-brown colour, which on standing deposits the more solid portion. It is used for burning. In 1905 the seeds were tested in the Indian Museum and found to give 28·86 per cent. of kernels and the kernels yielded to ether 42·9 per cent. of a clear light-yellow oil.—(Hooper.)

1139. *Antidesma Bunias. Spreng*, H.F.B.I., V. 358.

Syn : Stilago Bunias, *Linn*, Roxb. 713.

Vern. : —Ariya poriyam (Mal.) ; Âmati (M.).

Habitat :—Throughout the hotter parts of India, from the Nepal and Sikkim Terai and Assam southward to Singapur and Ceylon. (J. D. Hooker.) Western Ghats from the Konkan forward. (Gamble.)

A small, evergreen tree. Bark greyish-brown. Wood red, hard ; young parts pubescent. Leaves very variable, rather large, 4-6in. by 1¼ 2½in , lanceolate or obovate-lanceolate, tapering at base, slightly acuminate, apiculate, glabrous, shining. Petiole short, stout , stipule acicular, hairy, quickly deciduous. Flowers numerous, lax, reddish; spikes solitary, 1-3in. stalked, terminating branchlets. Male flowers sometimes branched at base, sessile ; female flowers slightly stalked. Male calyx tomentose ; segments 3, shallow, rounded ; disk lobed, glabrous ; stamens 3, exserted ; pistillode, short, truncate. Female flower :—Ovary glabrous; stigmas 3, large, short, dilated, spreading. Fruit ⅓in., globose, ovoid, stalked, smooth, very juicy, black when ripe, previously red. The fruit is acidulous and pleasant to taste. (Trimen.)

Uses :—The acid leaves are used in snake-bites, and, when young, are boiled and used in syphilitic cachexia. (Lindley.)

1140. *A. Alexiteria, Linn.*, H.F.B.I., V. 359.

Vern. :—Noli tali-marum (Tam.).

Habitat :—Southern Deccan Peninsula.

A much-branched, small tree. Young shoots glabrous. Wood hard, usually red, smooth, apt to split and warp. Leaves glabrous above, 1-3in., sub-sessile, from oblong or lanceolate to orbicular-ovate or-obovate obtuse, acute or acuminate, brown when dry, reticulate and shining on both surfaces, coriaceous; nerves usually very slender and obscure; petiole very rarely, $\frac{1}{12}$ in. Spikes simple or panicled, slender, pubescent, 1-1½in.; calyx 4-lobed, very minute. Disk glabrous; stamens 3. Female flowers shortly pedicelled. Stigmas very short, sub-lateral. Fruit ¼in. diam., gibbously orbicular, turgid.

Use:—The leaves in decoction are used for snake-bites. (Balfour.)

1141. *Jatropha glandulifera*, *Roxb.*, H.F.B.I., v. 382; Roxb. 689.

Sans.:—Nikumba.

Vern.:—Addalay (Tam.); Dundigapu; Nela-amida (Tel.); Lál-bherenda (B.); Verendi (Kol.); Undar-bibi, jangli-erandi (H.); Totla-gida (Kan.).

Habitat:—Deccan Peninsula, from the Concan southwards.

N.B.—The legend concerning the first springing up of the plant at Pandarpur mentioned by Dymock (Pharmacogr. Ind. III, 272) and Cooke (Flora of Bomb. II. 597) is not true (K. R. K.).

A shrub or small, glaucous-looking, evergreen tree, with much clear yellowish juice; trunk short, stout, dichótomously-branched, glabrous. Leaves 3-4in. long, and as broad, deeply 3-5-lobed; lobes obovate or elliptic acuminate, or acute at the apex, leafy, cordate at the base, sharply serrate with glandular bristles at the serrature tips; lateral nerves numerous, slender; petioles 2-3in. long, not glandular, nor hairy. (K. R. K.). Stipules divided into capillary gland, tipped; segments bracts setose and glandular. Flowers greenish yellow, (Hooker, but Dymock says "dull red"), glandular, in long peduncled corymbose cymes. Male flowers greenish-yellow. Calyx ⅛in. long, glabrous, very deeply divided; lobes ovate, obtuse. Corolla 5-lobed, lobes obtuse, ⅛in.; tube very short. Stamens 8, connate at the base into a column, free above. Disk of 5 glands

at the base of a staminal column. Female flowers:—Calyx divided to the base or nearly so; segments 5. ovate, acute. Ovary glabrous. Fruit smooth, ellipsoid; capsule ½in. diam., slightly 3-lobed; seeds ellipsoid oblong, smooth, shining, black. (Talbot, Brandis and Gamble.)

Uses:- The seeds yield by expression a fixed oil, held in much esteem by the Hindus as a stimulant application in rheumatism and paralysis. (Ainslie quoted in Ph. Ind.)

The oil possesses purgative properties. It is also used as an application to sinuses, ulcers, foul wounds and ringworm. The root brayed with water is given to children suffering from abdominal enlargements. It purges, and is said to reduce glandular swellings. The juice of the plant is used to remove films from the eyes. (Dymock)

On extraction with ether the seeds yielded 21·3 per cent. of a light straw-coloured oil which was turbid at 55° F. The seeds form 29·8 per cent. of the capsules Like other oils of this family it is employed as a purgative and is considered a remedy for ulcers and ringworm.

The following characters were found.—Fat: Acid value, 15·79; saponification value, 194 5; Reichert-Meissl value, 4; unsaponifiable, 1·38; butyro-refractometer at 27°, 76 5 Fatty acids: per cent 89·01; melting point, 35°; iodine value, 119 6; neutralisation value, 187·3; mean molecular weight 299·4. (A. K. Menon.)

1142. *J. nana, Dalz. and Gibs.*, H.F.B.I., V. 382.

Vern.:—Kirkundi (Mar).

Habitat:—The Concan; stony places near Poona and Bombay, etc.

A dwarf, glabrous, sparingly-branched shrub, 1-2ft., no glandular bristles. Leaves broadly cuneate at base, entire or 3-lobed; entire lobes broad, acute, 3-5in. diam. Petiole very short, stout, ⅛-½in.; stipules not seen. Flowers glabrous, sepals entire. Styles slender, stigmas capillate.

Use:—The juice is employed as a counter-irritant in ophthalmia. (Dymock.)

1143. *J. multifida, Linn.*, H.F.B.I., V. 383.

Habitat:—Native of South America, cultivated and naturalized in various parts of India.

A glabrous tree-like shrub. Bark light-brown, shining. Leaves orbicular, palmately cut into numerous narrow, entire or sub-divided, caudate, acuminate segments, 3-9in. diam., glaucous beneath. Petiole about as long as the blade. Stipules capillary, multifid, eglandular; bracts and entire sepals glabrous. Cymes long, peduncled. Flowers and peduncle, scarlet; petals free; anthers linear. Disk of female flower areolate. Observe the presence of the corolla in this plant unusual in the Euphorbiaceæ.

Uses:—The seeds are regarded as a powerful purgative. Dr. Waring once saw a case of poisoning from three of these nuts. Violent vomiting and purging, intense pain and heat in the stomach, with great prostration of the vital powers, were the principal symptoms. The patient recovered under the use of lime juice, diluted with water, and stimulants. (Ph. Ind.)

1144. *J. curcas*, *Linn.*, H.F.B.I., V. 383; *Roxb.* 689.

Vern:—Bagherenda, safedind (H. and B); Kadam (Nepal); Kaat-amunak (Tam.); Nepalam (Tel.); Thinbankyeksu (Burm.); Mogali-eranda (M.); Yerand, Jepal (Bomb.).

Habitat Common near villages, cultivated and naturalized throughout India

An everegreen shrub. Trunk short, irregular. Young shoots and cymes glandular, tomentose, with an opaque, saponaceous juice; bark grey or light-brown, smooth, shining, peeling off in thin papery flakes. Wood white, or greyish-white, spongy, soft, corky in texture, loaded with starch. Pith well-marked and dense in young and topmost branches. Leaves angular or 3-5-lobed or broadly cordate, 4-6 by 3-5in. Lobes acute or obtuse, quite entire. Petiole 5-9in. long. Flowers yellow or yellowish-green, monœcious in terminal or sub-terminal corymbose cymes. The central flower in the cyme or in its fork is always female. Bracts small, entire, one below each sub-division of the cyme, and generally one pressing on the calyx. Sepals 5 imbricate, slightly puberulous, lanceolate, greenish. Corolla tubular, villous within; limb 5-lobed. Stamens 10 in 2 series. (Kanjilal.)

Filaments of the inner series connate. Anthers yellow, brownish-black when dry. Seeds oblong, large, black, $\frac{1}{2}$-$\frac{3}{4}$in. long, $\frac{3}{8}$in. broad, smooth. Albumen oily.

It is a hardy plant, which has taken quite kindly to the soil of Western India whether it be in the Konkan or in the Dekkan. In both these divisions of Western India, I have seen it grow profusely as a hedgeplant, where no human hand has watered it. It evidently takes its nourishment from the air, and from the soil in which it grows, depending mainly on the rain-water and dew, whenever it can get it. In the Konkan it gets its water-supply from the monsoon rains from June to October. Hooker says that the plant is ever-green. It is not so in the Konkan. I have seen that in the Thana and Ratnagiri districts it is leafless, though in inflorescence during April and May. Nay in 1898 in Satara (Dekkan) I found the plant leafless in January and February. The plant is a native of Brazil and of the West Indies." (K. R. K.)

Uses: The seeds yield an oil which is used as a purgative and emetic medicine, and also as an application in cutaneous diseases. (Gamble.) In overdoses the seeds act as an acro-narcotic poison. The diluted oil forms a useful embrocation in chronic rheumatism. The leaves are extensively used in the Cape de Verd Islands, in the form of decoction and cataplasm to the mammæ, as a lactagogue (*Pharm. Ind.*)

The root-bark is applied externally for rheumatism in Goa, and the same part of the plant, mixed with assafœtida and butter-milk, is, in the Konkan, prescribed in cases of dyspepsia and diarrhœa (Dymock.)

According to Dr. Evers the juice is useful as hæmostatic. (I. M. G., 1875, p. 66.)

It may be noted here that like the leaves of the Castor-oil plant (Ricinus communis, *Linn.*) the leaves of Jatropha curcas have galactagogue properties. A decoction of the leaves is used in the Cape de Verd Islands to excite secretion of milk in women (A. A. B. in Maunder's Treasury of Botany, Part I, page 363, Edition 1870). Dr. Bennett of Sydney (Australia) is credited with having made the following observation in his work entitled *The Gatherings of a Naturalist*:—

"The milky acrid glutinous juice, when dropped on white linen, produces an indelible stain, at first of a light-blue colour, but after being washed changes to a permanent brown: it might, therefore, form a very excellent marking ink." I have not been able to obtain such a stain. Will any of my readers help me in settling this point? (K. R. K.) The oil of Jatropha curcas seeds is said to be of a light colour, and used as a substitute for Linseed oil, as well as for dressing cloth (Maunder's Treasury of Botany.) It is also said to form a basis for the red dye of the cotton fabric known as *Turkey red.*

The juice has been very successfully used by me in the treatment of scabies, eczema and ringworm. (B. D. B.)

Oil was separated from seeds by treatment with alcohol into a non-poisonous insoluble and a poisonous soluble part. The toxic constituent, *curauolic acid*, was isolated from the soluble portion by stirring with a hot saturated solution of baryta, washing the resulting paste with cold water, drying, extracting with ether, evaporating the ether solution, extracting the residue with absolute alcohol, and treating the alcoholic solution with sulphuric acid. It set to a jelly at about 10°C.

Curcin, the toxic principle isolated from fat-free curcas seeds by extraction with physiological *Sodium chloride* solution, was very sensitive to acid, and had a retarding influence on the coagulation of blood. (J. S. Ch. I for 30-6-1914, p. 651).

The seeds yield about 34 per cent. of oil and the kernels about 52 per cent. The oil is yellow when fresh, becoming reddish on exposure to the air; it has an unpleasant odour, and strong purgative properties, more pronounced than those of castor oil. Curcas oil yields about 10 per cent. of solid fatty acids melting at 57·5°; the liquid fatty acids consist of about equal proportions of oleic and linolic acids. The specific gravity is 0·919 to 0·921; saponification value, 193·2; iodine value, 98·3 to 104·9; Reichert-Meissl value, 0·55; Maumené test, 65 to 68°. The fatty acids (95·5 per cent.) melt at 24-26°; iodine value, 105. (Agricultural Ledger, 1911—12, No. 5. p. 163.)

1145. *Aleurites moluccana, Willd.*, H.F.B.I., V. 384.

Syn.:—A. triloba, *Roxb.* 670.

Sans:—Aksota.

Vern.:—Akrót, Akola, Jangli-akrót, (H. and B.); Khasife hindé, Jouzebarri, (Ar.); Girdagáne hindí, Chahár maghze hindí, (Pers.); Jangli, Eranda, Jelapa, Jangli ákhróta Jáphala, Akhod (Mar.); Akhoda, (Guj.); Akrota, (Cutch); Náttu akrótu kottai, (Tam.); Nátu-akrótu-vittu (Tel.); Nát-akródu (Kan.); Vadam (Mal.); Kakkuna (Singh.); To-sikya-si (Burm.); Kanyin, Mak yau lik, Mak man yau (Shan) Buah keras, Kanieri (Malay). The names given in most parts of India to this tree are those which more properly belong to the Walnut, the akrót. It is, therefore, advisable to add the word "wild," *e.g.*, Jangalíakrot.

Habitat:—Occurs in various parts of India, especially the Malayan Peninsula. Wild in the Wynaad.

A large, evergreen tree, 40-60 ft., indigenous probably in the Malay Archipelago, cultivated in most tropical and subtropical countries, and here and there naturalized. Shoots, young leaves

and inflorescence densely clothed with brownish or grey stellate tomentum. Leaves ovate to ovate-triangular, often lobed, 4-12in. Petiole 2-5in. Flowers monœcious, white in large cymose, terminal panicles. Calyx velvety, bursting into 2 valvate lobes. Petals 5, ¼in. long Male flowers:—Stamens 15-20 on a hairy receptacle. Ovary 2-celled, hairy; styles bifid to the base. Drupe 2-2½in. diam. Seeds large, oily.

Uses:—The oil obtained from the kernels by expression, has been found in doses from one to two ounces to act as a mild and sure purgative, producing in from three to six hours after ingestion free bilious evacuations. It was found to approach nearly to Castor oil in the mildness and certainty of its operation, but superior to it as having neither taste nor smell, and as producing its cathartic action without any nausea. It may be worthy of further attention. (Ph. Ind.)

A French chemist has made the following analyses of the kernels:—

Water	5·000
Oil	62·175
Nitrogenous material	22·653
Non-Nitrogenous material	6·827
Ash	3·345
	100·000

Specific gravity of the oil 0 940.

The results obtained at the Imperial Institute by the analysis of oil extracted from the present sample of seeds, and those obtained by investigators who have examined Candle-nut oil previously, are given in the following table:—

	Oil from *Aleurites triloba*, examined at the Imperial Institute.	Oil from *Aleurites moluccana*, examined by		
		Lewkowitsch.	De Negre.	Fendler.
Specific gravity ...	0·9274 (15°C.)	0·92565 (15·5°C.)	0·920 (15°)	0·9254
Acid value ...	1·72	...	...	...
Saponification value	204·2	192·62	184-187·4	194·8
Iodine value ...	139·7	163·7	136-139	114·2
Hehner value ...	96·4	95·5	...	...
Wollny-Reichert value	1·98	...	...	...
Titer test ...	17·8°C	...	20°-21°C.	1·8

These results indicate that the oil belongs to the class of drying oils typified by linseed oil, and would be suitable for the manufacture of soft soap and in the preparation of oil-varnishes, paints and linoleum and other similar purposes, to which oils of this class are applied industrially. (Agricultural Ledger—1907—No. 4.)

1146. *Croton reticulatus, Heyne*, H.F.B I., V. 386.

Vern :— Pándhari or pándharisálá (Mar.).

Habitat :—Deccan Peninsula, from the Concan southwards.

A shrub with slender, terete branches Branchlets, leaves beneath and inflorescence silvery, lepidote. Leaves ovate or elliptic-lanceolate, acuminate, quite entire, shortly 3-nerved at the base, opposite and alternate, 4-10in , smooth and glabrous above, base acute or rounded ; petiole ½-1½in , rusty, lepidote Racemes few-fid, shorter than the leaves Sepals of male oblong , margins woolly, twice as large as the woolly oblong petals. Stamens glabrous except at the villous base, 15-18. Sepals of female linear, oblong, accrescent in fruit, sometimes ½in long. Ovary globose, stellately lepidote Styles very variable, usually 2-partite, with long, slender, unequally 2-fid arms Capsule ½in. long, broadly oblong, stellately lepidote

Use :—The bark is used as a bitter and stomachic (S Arjun)

1147. *C. oblongifolius, Roxb.*, H.F.B.I., V. 386, Roxb. 688.

Vern. :—Chucka (Patna) ; Baragach (B.) ; Arjunna (Oudh) ; Ach (Nepal) ; Kurti, konya, kuli, poter (Kol.) ; Putri (Lohardugga) ; Gote (Santal) ; Kote, putol (Mal.) ; Burma, parokupi (Ass.) ; Bhutan kusam (Tel.) ; Gonsur (Goa) ; Ganasura (Mar.).

Habitat :—Bengal, Ceylon, Behar, Central India and the Deccan Peninsula.

A small, deciduous, often gregarious tree. Bark 1in. thick, grey or brownish, inner bark red, coarsely fibrous. Wood yellowish-white, moderately hard. Branches rather stout. Shoots, young leaves, branchlets, inflorescence, calyx and ovary densely clothed with minute, orbicular, silvery scales. Leaves rather coriaceous, pale-green, glabrous when full grown, oblong-lanceolate, penninerved, more or less serrate, blade 5-10in. ; petiole

1-2in. long, very variable, ½-2½in., rather slender. Racemes often fascicled, elongate erect; pedicels long or short. Stamens 10-12, woolly below, glabrous above. Sepals of male broadly oblong; petals as long as sepals, woolly; disk glands 5, rounded. Sepals of female oblong; petals small, linear ciliate; disk depressed Ovary oblong, 3-gonous, styles 2-partite. Capsule globose, ⅓in. diam, lepidote, 3-lobed; top depressed.

Uses —The seeds and fruits are purgative.

"The Goanese and inhabitants of Southern Concan administer the bark in chronic enlargements of the liver and in remittent fever In the former disease, it is both taken internally and applied locally As an application to sprains, bruises rheumatic swellings, etc, it is in great request." (Dymock.) In the Southern Concan, it has a reputation as a remedy in snake-bites (Pharmacogr Ind III 287)

The Santals use the bark and root as a purgative and as an alterative in dysentery (Campbell)

1148. *C. caudatus*, *Geisel.*, H.F.B.I., v. 388.

Syn :—C drupaceum, *Roxb* 688.

Vern. :—Nan bhantúi (Beng), Takchabrik (Lepcha); Wusta (Uriya).

Habitat :- Eastern Himalaya, Sikkim and Bhotan Assam, Bengal and Sylhet to the Deccan

A large straggling shrub, more or less scandant. Stem often attaining 1-1½ft. Girth, branchlets, petioles, young leaves and inflorescence rough with stellate hair. Bark thin, grey. Wood white or yellowish-white, hard, close-grained. Leaves very variable, smaller 1-3in., ovate-cordate; larger 4-7in., orbicular-cordate; margin denticulate or rather coarsely toothed, often with a gland at the sinus or the teeth glandular, upper surface smooth or scaberulous, lower scabrid or tomentose; nerves 2-3 pair above the basal, pubescent above; glands minute. Petiole 1-2in., scabrid; stipules lacinate, glandulose. Racemes very long, slender, 1-10in. solitary, terminal Bracts subulate or 0. Pedicels long or short. Male flowers tomentose; sepals and petals of equal length. Disk-glands minute; receptacle villous with white hairs. Stamens 18-30, often far exserted; filaments

silky below. Female flowers :—sepals ovate, or oblong sub-acute, scabrid ; petals very minute, subulate, long-ciliate ; disk low, hirsute. Ovary densely woolly ; styles bifid, arms long, slender. Capsule large, globose, or broadly oblong, woody, ⅔-1in. long or broad, terete or with 6 slender ridges, densely rusty, scabridly pubescent, 6-valved, from the top downwards. Seeds very variable, dorsally compressed, slightly rugose. The variable fruit is the remarkable character of this plant. (J. D. Hooker.)

Use :—Mr. Home says the leaves are applied as a poultice to sprains.

1149. *C. Tiglium, Linn.*, H.F.B.I., v. 393 ; Roxb. 688.

Sans :—Jayapála ; Kanakaphala.

Vern. :—Jaypal (B.), Jamál-gota (H. and Mar.) ; Napál (Guz. and Kan) ; Nerválam (Tam) ; Nepála-vitna (Tel) ; Nir válam (Mal.)

Habitat :—Bengal, Assam and southward to Malacca, Burma and Ceylon.

A small, evergreen tree. The youngest shoots sparsely stellately hairy. Leaves membranous, glabrous, ovate, acuminate, more or less serrate, 2-4in , glands minute, sessile, 3-5 basal-nerves. Petiole 1-2in slender. Racemes 2-3in Rachis glabrous ; bracts subulate. Male flowers : —pedicels stellately hairy ; sepals nearly glabrous, tips bearded ; petals narrow, woolly-edged. Stamens 15-25, glabrous, receptacle, villous ; disk-glands 5, small. Female flowers :—Sepals villous at the base within. Petals 0. Disk obscure, annular. Styles slender, 2 partite. Ovary, stellately hispid and oblong. Capsule ¾-1in. long, white, turbinately obovoid, obtusely trigonous Seeds ½-⅔in., oblong, obtusely trigonous, pale.

Use :—The seeds and oil are officinal in both the Pharmacopeias and their uses are too well known to be mentioned here.

1150. *Crozophora tinctoria, A. Juss.*, H.F.B.I., v. 408.

Vern. :—Tappal buti, nilam, kukronda (Pb.) ; Shadevi, sonballi, subali (H.)

Habitat :—The Punjab, Salt Range, Sindh and the Deccan.

An annual, prostrate herb. The whole plant softly clothed with stellate tomentum. Root stout. Branches 6-10in. Leaves thick, softly tomentose on both surfaces, 1½-2½in. long, from ovate and sinuate-toothed or entire to rounded and obtusely-lobed. Petiole often 3in Racemes short, lengthening in fruit. Male flowers numerous; calyx globose, segments 5, valvate; petals 5; disk obscure; stamens 5-20 Female flowers:—pedicels at length decurved and sometimes 3in. long in fruit; calyx and petals of the male. Ovary and capsule stellately tomentose and clothed with silvery scales; capsule ⅓in. diam. (J. D. Hooker.)

Uses:—Lindley mentions it as possessing emetic, drastic and corrosive properties

Dr. J Hornsey Casson, Physician to Her Majesty's Legation in Persia, called the attention of the Director of Kew gardens to this plant which caused the death of 6 persons with symptoms of severe jaundice, abdominal pain, bilious vomitting, dilatation of pupil, bleeding from the nose, bloody urine tinged with bile and stupor. (Ph. J. Dec. 28, 1889, p. 504.)

1151. *C. plicata*, *Muell.*, *Arg.*, H.F.B.I., V. 409.

Syn..—Croton plicatum, *Willd.* Roxb. 687.

Vern.:—Shahdevi, súbali, sonballi (H. and Sind); Okharada (Guz); Khúdiokra (B); Pango nari (Santal); Pút kanda, nilkhanti, nil-ak-rai (Pb.); Gurugu chettu, linga miriyam (Tel.).

Habitat:—Throughout India, from the Punjab to Travancore and from Bengal to Pegu and Burma.

An erect hoary annual herb up to 2ft. high, with a long straight slender tap-root. Stem usually naked below, sparingly branched above. Leaves 2-4 in. long, ovate to orbicular, often obscurely 3-lobed, thick, rugose, pale-green, stellate-hairy on both surfaces; petioles 1-2in. long Male flowers:—Calyx ⅛in. long. Petals smaller. very thin, ovate-lanceolate. Stamens 15, in two whorls. Fem. flowers:—Sepals $\frac{1}{12}$in. long, triangular. Petals shorter and narrower. Capsules ⅓in. in diam., densely stellate-hairy, but without silvery scales. (Duthie).

Uses :—The ashes of the root are given to children for cough. The leaves are considered depurative. The seeds are used as purgative. (Stewart.) Its value in leprosy is asserted. (Drury.) The Santals mix the root with that of *Carissa Carandas* for blistering purposes. (Revd. A. Campbell.)

1152. *Acalypha fruticosa, Forsk.*, H.F.B.I., V. 415.

Syn. :—Acalypha betulina, *Retz.*, A. amentacea, *Roxb.* 686

Vern.—Chinna maram (Tam.), Chinni; Tsinni (Tel.), Chinni-ká-jhar (Dec.).

Habitat :—Deccan Peninsula

A low shrub, more or less covered with yellow, waxy glands, strong smelling or fœtid when bruised, very much-branched; branches slender, virgate, spreading or ascending, glabrous; young parts scurfily pubescent. Leaves alternate, numerous, but rather distant, ¾-2in., oblong or rhomboid-ovate, acute at base, shortly acuminate, coarsely or finely crenate-serrate, glabrous, with small punctiform, orange, scattered glands beneath. Petiole ¼-1¼in., slender. Stipules minute, persistent Flowers minute, sessile, on strict pedicels in clusters, crowded on short axillary spikes, male very numerous, with minute bracts. Stamens 8. Female 2 or 3 at base of spikes, each with toothed bracts; styles 3, split into many filiform segments. Capsule with 3 rounded lobes, densely pubescent; seeds smooth (Trimen).

Uses :—Leaves attenuant and alterative and an agreeable stomachic in dyspepsia and other ailments. The dose of the infusion of the leaves as ordered by the Vaidyas in Southern India is half a teacupful twice in the day (Ainslie).

1153. *A. indica, Linn.*, H.F.B.I., V. 416 Roxb., 685.

Syn. :—A. spicata, *Forsk.*; A. ciliata and A. canescens.

Vern. :—Kuppi, khokali (H.); Khokli, khájoti (Mar.); Vanchhi kánto (Guj.); Muktajuri, shet basanta, murkanta (Beng.); Indra-maris (Uriya); Kuppaimeni (Tam.); Kuppai-chettu, murkanda-chettu, (Tel.); Chalmari, kuppi (Kanara).

Habitat :—A small annual shrub occurring as a weed in gardens and road-sides throughout India.

A pubescent, herbaceous, erect annual, 1-3ft. Branches numerous, long, ascending, angular, finely pubescent. Leaves 1½-3in., rhomboid-ovate, tapering at base, acute, serrate, glabrous, thin, somewhat 3-nerved at base, pale-green. Petiole usually longer than leaves, slender, spreading. Stipules minute. Flowers sessile, green, in numerous lax, erect, axillary spikes; males very small, clustered near summit. Stamens 8; females solitary, scattered, each with a large, leafy, truncate, dentate bract. Ovary hispid. Capsule small, quite concealed by enlarged bract, often only 1-seeded. Seed ovoid, acute, smooth.

A common weed flowering all the year round.

Uses :—There is no mention of this plant in Sanscrit works on Medicine. It is used as expectorant as a substitute for senega. It has also a diuretic action. It is a useful remedy for bronchitis, asthma and pneumonia; also for rheumatism. It was formerly employed as a purgative and anthelmintic.

"The roots, leaves, and tender shoots are all used in medicine by the Hindus. The powder of the dry leaves is given to children in worm cases, also a decoction prepared from the leaves with the addition of a little garlic. The juice of the same part of the plant, together with that of the tender shoots, is occasionally mixed with a small portion of margosa oil, and rubbed on the tongues of infants for the purpose of sickening them and clearing their stomachs of viscid phlegm. The *hakims* prescribe the koopamaynee in consumption." (Ainslie, Mat. Ind. II., 161.) "The leaves with garlic are regarded as anthelmintic; mixed with common salt the leaves are applied externally in scabies, and the juice rubbed up with oil is used externally in rheumatism." (Balf. Cycl.) According to Rheede, the root is used as a purgative on the Malabar Coast. (Hort. Mal., X., 161.) This property "is confirmed by Dr. H. E. Busteed, who has used it as a laxative for children." A contributor in Dacca informs me he uses it as a laxative, and in an official correspondence with the Government of India, Rai Kanai Lal De, Bahadur, includes the muktajhuri amongst emetics. In

Bombay "the plant had a reputation as an expectorant, hence the native name khokli (cough)." (Dymock, Mat. Med. W. Ind., 588.) "Dr. George Bidie furnishes the following remarks: 'The expressed juice of the leaves is in great repute, wherever the plant grows, as an emetic for children, and is safe, certain and speedy in its action. Like Ipecacuanha, it seems to have little tendency to act on the bowels or to depress the vital powers, and it decidedly increases the secretion of the pulmonary organs. Probably an infusion of the dried leaves or an extract prepared from the green plant, would retain all its active properties. The dose of the expressed juice, for an infant, is a teaspoonful'" (Pharm Ind.) A decoction of the leaves is given in ear-ache; a cataplasm of the leaves is applied as a local application to syphilitic ulcers, and as a means of relieving the pain of snake-bite. (Drury.) According to Nimmo the roots "attract cats quite as much as those of valerian" (Voigt, 160; Treasury of Botany.)

"Much used by Mahomedan practitioners in treating cases of acute mania in early stage. The fresh juice (℥i) with (6 gr.) chloride of sodium dissolved in it and dropped in both nostrils every morning, followed by cold shower-baths for three mornings regularly, proves highly successful. Thus it is supposed by them to act as a 'brain purge,' so called probably owing to a quantity of mucus and other matter escaping from the nostrils immediately after the application of the above recipe. I have given it internally; it acts as an anthelmintic and laxative." (Surgeon E. W. Savinge, Rajamundry, "Juice of the fresh plant emetic, laxative; dose one to four drachms, according to age. Fresh leaves ground into a paste, made into a ball, to the size of a large marble and introduced into the rectum, very useful in relieving obstinate constipation of children." (Apoth. Thomas Ward, Madanapalle, Cuddapah.) "The juice or the bruised leaf is applied to the skin to allay the irritation caused by the bite of the centipede." (Surgeon Ruthnam T. Moodelliar, Chingleput.)

"The juice of the fresh leaves mixed with lime is applied in painful rheumatic affections." (Surg.-Maj. John Lancaster,

M. B., Chittur.) "Used in scabies and ringworm, also internally as a carminative" (Surg.-Maj. F. F. L. Ratton, Salem.) "The root possesses purgative properties; the leaf-juice is a safe, useful emetic, especially adapted for children." (Surg.-Maj. F. M. Houston, Travancore, and Mr. John Gomes, Trivandrum.) "The juice of the fresh plant is given to children as an emetic in ℥½ to ℥1 doses" (Apoth. F. Norman, Chattrapur, Ganjam.)

"This plant is called in Kanara chalmarî as well as kûppî (the latter word means a 'heap,' the plant being found in waste places and rubbish heaps) The natives use it in congestive headaches: a piece of cotton is saturated with the expressed juice and inserted into each nostril, relieving head symptoms by causing haemorrhage from the nose The powder of the dry leaves is used in bed sores and wounds attacked by worms In asthma and bronchitis I have employed it with benefit both in children and adults

"Mode of preparation.—Macerate 3 oz. of the fresh leaves, stalks, and flowers, with a pint of spirits of wine, in a closed jar for 7 days, occasionally agitating the same. Strain, press, filter, and add sufficient spirits of ether to make one pint.

"Physiological effects.—In small doses it is expectorant and nauseant: in large doses emetic

"Dose.—Minims 20 to 60, frequently repeated during the day in honey." (Surgeon-Major E. H. R. Langley, Bombay.) "One drachm of the expressed juice of the fresh leaves is an easy and rapid emetic in children The bruised leaves are useful as an application to maggot eaten sores" (Surgeon W. D. Stewart, Cuttack.)

"The root, bruised in hot water, is employed as a cathartic, and the leaves as a laxative in decoction mixed with common salt. The leaves are used in scabies, and mixed with chunam in other cutaneous diseases (Drury)."

***Chemical composition.*—The whole plant of *A. Indica* was dried at a low temperature, reduced to powder, and exhausted with 80 per cent alcohol. The alcoholic extract was mixed with water, acidulated with sulphuric acid, and agitated with petroleum ether, and ether; the solution was then rendered alkaline and agitated with ether. During agitation with petroleum ether, a quantity of dark matter separated, which was partly soluble in ether, and in alkalies, and contained much colouring matter. The petroleum ether extract**

was dark and viscid, and had an aromatic odour, but did not yield any crystalline deposit on standing : in absolute alcohol it was soluble, and on spontaneous evaporation some yellow matter separated, which was destitute of crystalline structure on microscopic examination. The alcoholic solution had no special taste. The ether extract was yellow, and had an aromatic somewhat tea-like odour, and on standing became indistinctly crystalline. In warm water a portion dissolved, the solution possession a strong acid reaction, and affording a dirty reddish coloration with ferric chloride : it did not precipitate gelatine, and gave no reaction with cyanide of potassium. The portion insoluble in water was dissolved by ammonia, affording a deep yellow coloured solution with a somewhat camphoraceous odour, the addition of acids causing the precipitation of whitish flocks.

The ether extract obtained from the original aqueous solution, after it had been rendered alkaline, contained a well-marked alkaloidal principle, which after purification afforded the following reactions : with Fröhde's re-agent pinkish in the cold, dirty blue on warming ; with sulphuric acid yellowish-red ; no reaction with sulphuric acid and potassium bichromate ; no reaction with ferric chloride ; with nitric acid a yellow coloration ; it was not precipitated by chromate of potash from an aqueous solution acidulated with sulphuric acid ; taste harsh, without bitterness. We propose provisionally to call this principle *Acalyphine* (*Pharmacogr. Ind.* III. 293-294)

1154. *A. hispida, Burm.*, H.F.B.I., V. 417.

Syn. :—Caturus speciflorus, *Linn* , Roxb. 714.

Vern. :—Watta-tali (Mal.).

Habitat :—Cultivated in gardens.

"This is included by J. D. Hooker (see p. 417, Vol. V., F B In.) among the doubtful and excluded species " with the following remark :—" Caturus spiciflorus Roxb. Fl. Ind. 111, 760), with very long spikes minute bracts and very long styles is a garden plant only in India " Roxburgh's description is as follows : "Shrubby. Leaves long-petioled, cordate, serrate. Spikes pendulous, longer than the leaves." Male calyx absent ; Corolla trifid. Female calyx three or four parted ; corolla absent Styles three. Capsule tricocous. With regard to the figure of Acalypha hispida Burm., from Burmans' Flora Indica, 1768, which is reproduced in this work (Plate 875A), Roxburgh says that same would be a tolerable representation of the female if the spikes were longer and pendulous."

Uses :—Flowers said to be specific in diarrhœa and similar disorders ; boiled in water or administered in the form of a

conserve. (Lindley.) Its leaves are beaten up with green tobacco leaf and infusion of rice and applied to inveterate ulcers. (Rheede).

1155. *Trewia nudiflora, Linn.*, H.F.B.I., V. 423.

Sans. :—Pindâra, Karahâta, Kurangaha.

Habitat :—Common in the hotter parts of India.

A deciduous dioecious moderate-sized tree. Bark smooth grey. Wood white soft not durable. Young shoots, inflorescence and sometimes full-grown leaves clothed with flocculent cottony wool or sometimes nearly glabrous. Leaves ovate, opposite, 5-7in., cordate at base, entire, acuminate, glabrous above, finely stellate-hairy on veins beneath, thin, bright green, somewhat 3-nerved at base. Petiole cylindric, 2-3in., finely pubescent Stipules minute, acute, soon falling. Male flowers :—on slender horizontal pedicels Racemes spicate, 4-6in., buds globose. Sepals valvate, concave. Female flowers :—Ovary globose, densely stellate-hairy style yellow thick erect, stigmas very long $\frac{1}{2}$-$\frac{3}{4}$in. Fruit about $\frac{1}{2}$in., roughish with scattered stellate hairs. Seed brown, broad pericarp thick, almost woody. Flowers pale green.

Uses :—It is described in the Nighantas as sweet and cooling, useful for the removal of swelling, bile and phlegm; the root is prescribed in gouty or rheumatic affections.

Rheede states that the root in decoction is used to relieve flatulence, and is applied locally in gout (Pharmacographia Indica, Vol. III., p. 295).

1156. *Mallotus philippinensis, Muell.*, H.F.B.I., V. 442.

Syn. :—Rottlera tinctoria, *Roxb.* 737; R. aurantiaca, *Hook.* and *Arn*; R. affinis, *Hassk.*; R. Montana and Mollis, *Wall.*; Croton philippinensis, *Lamk.*; C. Punctatus, *Retz.*; C. coccineus, *Vahl.*; C. montanus, *Willd*; C. distans, *Wall.*; C. cascarilloides, *Rauesch.*

Sans. :—Kapilâ, Kampilla rechanaka Madhukah (Punnaga

is incorrectly given in many books as Sanskrit for this plant,—see Calophyllum inophyllum).

Vern.:—Kambilá, kamúd, kamelá, rori rohini, chamar gular, hingur, sendúr, kúnkú, sinduri, kambhal, vasanta-gandha (powd.), (H.); Dhola sindur, kamila, túng, késar (=saffron), kamalá guri (the dye powder), (B.); Kumala, súndragundi, bosontogundi, (Ur.); Rora, (Sant.); Gangai, puddum, jaggarú, hibang, lasson, (Ass.); Chinderpang, machugan, (Garo); Sinduria, safed mallata, (Nep.); Puroa, tukla, numboongkor, (Lep.); Baraibuni, sindurpong, (Michi); Koku, (Gond); Kaimbil, (Kash.); kamela, kambila, kámal, reini, rúlya, (Pb.); Kámbaila (Push.); kamala, kunkuma, kapil, shendri, shindur; (Mar.); kapilo, (Guz.); kapila, kamela-mavu (? pod-pollen), thavittai, kuran gumanjanathi kapila rung, kapilapodi, thiruchúrna maram, (Tam.); kúnkuma, kapila, vasantagandhamu (powder), chendrasindhuri, sundragundi, (Tel.); rangamále, corunga-manje, sarnakesari, hulichellu, kunkuma, kesalay, kamela, (Kan.); Ponnagam (? Calophyllum inophyllum), (Mal.); tawthidin, pothidin, thidinhmok (the dye) (Burm.); Tawthadin, (Shan); Hamparandella, (Sing.).

Dr. Buchanan-Hamilton called the tree corunga munji maram or "Monkey face tree," because these animals paint their faces red by rubbing them with the fruit.

Habitat:—A small, evergreen tree, found throughout tropical India; along the foot of the Himálaya from Káshmir eastwards (ascending to 5,000 feet); all over Bengal and Burma, Singapore, and the Andaman Islands; and from Sind southwards to Ceylon. Distributed to China, the Malay Islands, and Australia.

A large shrub or small evergreen tree, 25-30ft., with usually "buttressed" trunk, says Gamble. Bark ¼in. thick, grey, inner substance red, marked with irregular cracks. Wood smooth; grey to light red, hard, close-grained, no heartwood. Young shoots, inflorescence, and sometimes fullgrown leaves beneath clothed with flocculent cottony wool. Branches rather slender. Leaves 3-9in. long, alternate, ovate, ovate-oblong or lanceolate, acuminate entire or sinuate-toothed, glabrous above, beneath subglaucous, puberulous covered with scarlet glands,