Dymock writes that in Bombay a powder of the tubers "is used as a popular local application in mumps (*Galgand*), but as they are generally combined with more active remedies, such as Croton seed, Aconite, and Nux-vomica, it is probable that they do not contribute much to the cure." "The substance of the rhizomes and tubers is of a pale straw-colour, has a bitter, pungent, camphoraceous taste, much like that of true Zedoary; the whole plant is aromatic." In the Gazetteer of the Rewa-Kanta District, it is stated that the roots are stomachic and are also applied to swellings. Thwaites remarks that in Ceylon the root is employed medicinally, but he does not state for what purpose The almost universal belief (from one side of India to the other) that the rhizomes are useful in reducing swellings, would suggest the desirability of this subject being more carefully investigated in the future (Watt)

1240. *Hedychium spicatum, Hamilt.*, H.F.B.I., VI. 227.

Sans.:—Karpurakáchalí.

Vern.:—Sit-rutí, kapúr kachri (Hind.); Kachur-kachu, ban kela, sákí, banhaldí, khor, shalwi, shedúri, (Bazár root) = kapúr kachrí, kachúr (Pb.); Kapur kachari* (Mar. and Guz.); Shimai-kich-chilik kishangu (Tam)

Habitat.—Sub-tropical Himalaya; Nepal; Kumaon.

A perennial herb. Rootstock horizontal, tubrous; root fibres not much thickened. Stem elongate, leafy. Leaves reaching 1ft. or more, very variable in breadth, glabrous, oblong or oblong-lanceolate. Spike sometimes 1ft., dense-fid. Bracts oblong, obtuse, green, large, 1-fid, 1-1½ by ¾in. broad. Flowers ascending and closely imbricate, white. Calyx shorter than the bract. Corolla-tube 2-2½in; segments 1in., linear. Staminode 1in., lanceolate; lip cuneate, deeply bifid, ½-¾in., broad, not at all clawed. Stamen 1, rather shorter than the lip; anther linear, ¼-⅓in., 2-celled, connective very narrow, neither

* It is a mistake to call this plant Kapur Kachri. The real Kachri is Kæmpferdie galanga. The Marâthi name of Hedychium spicatum is Sonatakka. (K. R. K.)

A large, deciduous, aromatic tree, very nearly glabrous; young shoots tomentose. Bark grey, characteristically marked by deep, vertical, parallel fissures, ½in. to 2in thick. Wood moderately brown, with darker streaks, often beautifully mottled. (Gamble.) Leaves imparipinnate, 6-12in., alternate. Leaflets 5-13 or 7-9, odd one the larger, stalked, side ones opposite, sessile ovate-oblong, 3-8in., pointed, entire. Flowers green, male and female on the same tree, appearing with the leaves. Male flowers numerous, in pendulous, lateral catkins, 2-5in., long, on the previous year's wood above the leaf scars, often two superposed. Perianth narrow, nearly flat, irregularly 5-lobed, combined with the branch, the free tip of which appears on the underside. Stamens 15-20, nearly sessile. Female flowers 1-3, clustered, sessile, on the ends of branches; the bracts combined in a pubescent, ovoid involucre aduate to the ovary, its narrow mouth obscurely 4-toothed; perianth of 4 linear lanceolate lobes inserted on the mouth of the involucre, alternate with its teeth. Ovary 1-celled; ovule 1. Style arms 2, short, broad, recurved, roughly wrinkled. Drupe ovoid, 2in. long, the green, thick, fleshy rind enclosing a woody wrinkled 2-valved nut; the edible part consisting of the large, corrugated, 4-lobed cotyledons of the single seed. (Collett.)

Uses :—The bark is used as an anthelmintic and detergent; the leaves are astringent and tonic, in decoction are supposed to be specific in strumous sores, and to be anthelmintic; the fruit is also believed to have an alterative effect in rheumatism.

The kernels afford by expression about 50 per cent. of a clear sweet oil, largely used in the hills for culinary purposes and illumination. Stewart states that a large proportion of the oil is prepared by simply bruising the kernel between stones The oil-cake is a good cattle-food. Walnut oil has a yellow or orange-yellow colour with a slight odour of linseed and a nutty flavour. Practical experiments show it to be a strong drying oil. Crossley and Le Sueur (1898) testing a sample expressed in India found it to have constants agreeing well with those previously recorded: Specific gravity at 15·5°, 0·9259; acid value, 10·07; saponification value, 192·5; iodine value, 143·1; Reichert Meissl value, 0·00; insoluble fatty acids, 95·44 per cent. (Agricultural Ledger 1911-'12, No. 5. p. 166).

N. O. MYRICACEÆ.

1196. *Myrica Nagi, Thunb.*, H.F.B.I., V. 597.

Syn :—Myrica sapida, Wall. M. integrifolia, *Roxb.* 765.

Sans. :—Katphala, kaidaryama.

Vern. :—Kaiphal (B., H., Sind. Pb. and M.); Ding solir (Khasia); Kobusi (Nep.); Kari-phal (Guz.); Maru dampattai (Tam.); Kaidaryamu (Tel.).

Habitat :—Sub-tropical Himalaya, from the Ravi eastwards. The Khasia Mts., Sylhet and southwards to Singapore.

A small, aromatic, nearly glabrous, evergreen tree. Leaves crowded towards ends of branches, lanceolate, 3-5in., acute or obtuse, entire, the lower pale or rust-coloured, minutely gland-dotted, aromatic. Stalks short, pubescent; the leaves of the young shoots sometimes 5-8in., and toothed. Bark grey, a brownish-grey, roughly with deep vertical wrinkles. Wood purplish-grey, hard, close-grained, apt to warp. Flowers minute, uni-sexual, glandular, the male and female on different trees. Male flowers in catkins, $\frac{1}{4}$-1in., long, solitary in the leaf axils or sessile on common, drooping, axillary stalk, 1-3in long; bracts orbicular, often with 2-3 smaller ones. Perianth none. Stamens 3-6, filaments free except at the bases. Female flowers in axillary, erect spikes, $\frac{1}{2}$-1in. long; bracts 2-4; perianth none; ovary 1-celled; style-arms 2, long, incurved, red. Drupe sessile, scaly, ovoid, $\frac{1}{2}$-$\frac{3}{4}$in, flesh red, stone wrinkled and pitted. (Collett.)

A very commonly cultivated tree in China and Japan, and is much esteemed for its sub-acid fruits, which are eaten by natives and Europeans both raw and cooked. I can find no difference between it and the *M. integrifolia* of Roxb.,**

***Myrica integrifolia* is a very common native bush or tree in the mountainous parts of Bengal and the eastern peninsula of India, and especially in Silhet, where it is called Sophee, and the fruit is eaten both pickled and raw' (Hooker in Curtis' Bot. Mag. for Sept. 1, 1868.)**

Uses :—The bark is described by writers on Sanskrit medicine as heating, stimulant, and useful in diseases supposed to be caused by deranged phlegm, such as catarrhal fever, cough, and affections of the throat. It enters into the composition of numerous formulæ for these diseases, in which it is combined with other stimulants and alteratives. The powdered bark is

occasionally used as a snuff in catarrh with headache. (U. C. Dutt.) It is also used by Hindus at the present day, mixed with ginger, as a rubefacient application in cholera, &c., and according to Irvine, *kaiphal* and ginger mixed, is the best substance that can be employed for this purpose. Dymock writes, "Muhammadan writers tell us that the bark is resolvent, astringent, carminative and tonic; that it cures catarrh and headaches; with cinnamon they prescribe it for chronic cough, fever, piles, &c. Compounded with vinegar, it strengthens the gums and cures toothache; an oil prepared from it is dropped into the ears in earache. A decoction is a valuable remedy in asthma, diarrhœa, and diuresis; powdered or in the form of lotion, the bark is applied to putrid sores. pessaries made of it promote uterine action. The usual dose for internal administration is about 60 grains. *Dahn-el-kandul*, an oil prepared from the flowers, is said to have much the same properties as the bark."

The ground bark yields a coloring principle, named *Myricetin*. The yield of coloring matter from 100 grams of bark averaged from 0·23 to 0·27 gram. Its formula is $C_{15}H_{10}O_8$ Its points of similarities to, and differences from, other coloring principles are given in the following table:—

		Chromium.	Aluminium.	Tin.
1.	Myricetin	Red brown	Brown-orange ...	Bright red-orange.
	Fisetin	Ditto ...	Brown-orange, inclining to red.	Slightly less red.
	Quercetin	Ditto ..	Brown-orange, inclining to yellow.	Bright orange.
2.	Morin ..	Olive-yellow ..	Dull yellow ...	Bright yellow.
3.	Gentisin ..	Green-yellow, dull and pale.	Bright yellow tint, very pale, scarcely dyed.	Cream colour, scarcely dyed.
	Euxanthone	Dull-brown, yet yellow.	Bright yellow, pale.	Bright yellow tint, very pale, scarcely dyed.

Analysis of the bark:—

Tannin matters absorbed by hide	27·3
Soluble non-tanning substances	7·9
Fibre and insoluble matters	52·3
Moisture	12·5
	100·0

(J. Ch. S. T. 1896 p. 1287.)

N. O. CASURINÈÆ.

1197. *Casuarina equisetifolia, Forst.*, H.F.B.I., v. 598.

Syn. :—C. muricata, *Roxb.* 623.

Vern. :—Jangli saro, janglijháú, Vilayati saro (H.); Ján (B.); Jurijur, muj-jun (Sind); Sarpúbala, sarova, suru (Mar.); Chouk, shavuku-maram, shavuku-pattay (Tam.); Serva, chavuku-mánu, chavuku-patta (Tel.); Kásrike (Mysore); Sura (Kan.); Aru, chavaka-maram (Mal.).

Habitat :—On the east side of the Bay of Bengal from Chittagong southwards, cultivated elsewhere in India. Introduced into the plains as a roadside tree, and from its resemblance to the Tamarix received the vernacular names of this plant.

The tree is very useful in the reclamation of land near the sea, and is much valued in the Madras and Bombay Presidencies for planting on sand-dunes along the coasts of Coromandel and N. Kanara.

A large, evergreen tree, tall, straight-stemmed. Bark brown, rough, fibrous, peeling off in vertical strips. Wood reddish-brown, very hard, cracks and splits. The ends of branches thickly set with numerous, long, slender branchlets, which are mostly deciduous and fulfil the function of leaves. Branchlets jointed, the internodes $\frac{1}{6}$-$\frac{1}{4}$in. long, 6-8-ribbed, with fine hairs at the bottom of the furrows between the ribs and stomata in the furrows only. The ribs of each joint terminate upwards in the teeth of a membranous sheath, alternating with the ribs of the next joint above. Opposite these teeth are axillary vegetative buds, of which, as a rule, only one or few grow out into branchlets. These axillary buds mostly develope at the ends of branchlets where the joints have not yet lengthened out. Here the teeth of the annular sheaths are much longer (up to $\frac{1}{4}$in.) than on the lower and older joints, and they are densely clothed with fine hairs. Flowers uni-sexual. Males monandrous, axillary, under the teeth of the annular sheaths of terminal, short jointed, cylindric spikes 1in., long. Perianth of 2 large scales enclosing the anthers and 2 smaller at right angles to the first, anthers

oblong, 4-celled; filament short. Females in small ovoid spikes at the ends of lateral branchlets, consisting of very short joints, one flower under each tooth of the annular sheath. Perianth of 2 large scales enclosing the ovary, which, as the seed ripens, grow out into 2 large woody valves, more or less hairy, supported before maturity by the tooth of the sheath. Ovary 1-celled, with 2 pendulous; ovules, only one of which developes into a seed. Style short, dividing into 2 long filiform, garnet-coloured branches. Fruit a woody, globose cone, ¼in. diam.; testa aduate to the walls of the achene, which terminates in a long membranous wing. Albumen 0; embryo straight, radicle superior; cotyledons flat. The tree is monœcious the male and female flowers are sometimes, found on the same branch, but (as often happens with monœcious trees) some trees habitually bear male and other female flowers only. (Brandis).

This is one of the most interesting plants in the vegetable kingdom as regards its morphological peculiarities as well described by Brandis.

Uses:—The bark, according to Dr. Gibson, is an excellent and often readily available astringent in the treatment of chronic diarrhœa and dysentery. In infusion it is employed as a tonic

N. O. CUPULIFERÆ.

1198. *Betula utilis, Don Prod.*, H.F.B.I., v. 599.

Syn.:—Betula Bhojpatra, *Wall.*

Sans.:—Bhurjapatra.

Vern.:—Bhejpattra (H.); Bunj, Burzal, bhuj phurz (Pb.); Shák or shág, pad, phatak, takpa (Ladak, Lahoul, Piti, and Kanawar); Phuspat (Nepal); Bhurjpatra, bhojpatra (Bomb., Cutch and Guzerat)

Habitat:—Temperate Himalaya, from Kashmir to Sikkim and Bhotan.

A moderate-sized, deciduous tree, often gregarious, 40-50 feet or even 60ft., or shrub at high altitudes. Bark smooth, shining, reddish-white or white, with white, horizontally oblong lenticels,

the outer bark consisting of distinct, thin, papery layers, peeling off in broad, horizontal rolls. In these layers, the lenticels appear as pink, elongated, oblong patches. Wood white, with pinkish tinge, tough, even-grained, moderately hard. (Gamble). Youngest shoots and leaves pubescent. Pith oblong. Leaves 2-3in. ovate, acuminate, irregularly serrate, glandular beneath, slightly hairy along midrib and nerves, which latter are in 8-12 pair. Petiole ½-⅔in. Bracts of male spikes ciliate, stipulate; anther-cells glabrous, save with a few hair at the tips. Female spikes solitary, stout; bracts pubescent, 1-2in. by ½-⅛in. diam. Nuts with a narrow wing; bracts in fruit coriaceous, deeply, 3-lobed, broader than the wings of the nut.

Uses:—The decoction of the bark is used as a wash in otorrhœa and poisoned wounds. (U. C. Dutt) The infusion of the bark is used as a carminative; it is prescribed also in hysteria. It has also certain aromatic and antiseptic properties

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1199. *Quercus incana, Roxb.*, H.F.B.I., v. 603; Roxb. 674.

Vern.:—Banj, ban or bán (Kumaon); Sila supári (Kashmir); Bán, ban, rin, rinj, vari, banj, máru, kharshu, shindar, kharpata serei, daghun-bán (Pb.)

Habitat:—Temperate Himalaya; from the Salt Range and Murree to East Nepal.

An evergreen tree, attaining 50-80ft., and trunk 4-12ft. in girth; bark dark-grey, rough with cracks and fissures. Leaves 3-6 by 1-2in., oblong or ovate-oblong or ovate-lanceolate, acuminate, mucronate-serrate, tough and coriaceous, young pinkish and woolly all over, mature dark-green and glabrous above, densely white or grey, rarely brownish, tomentose beneath; lateral nerves 12-20 pairs, straight, parallel; base acute; petiole ½-¾in. long. Male spikes slender, drooping, 2-4in. long, often much interrupted; perianth 4-5-lobed; anthers glabrous. Female flowers axillary, sessile, solitary or clustered on current year's shoots; styles linear-clavate, spreading. Acorn generally solitary, usually on current year's shoots; cup at first enclosing the nut, glabrate, rough, woody;

nut $\frac{4}{6}$in. long, conico-ovoid, canescent, brown when ripe. (Kanjilal.)

Uses:—The acorns form the medicine known in the Punjab bazars as *balút*. They are given as a diuretic in gonorrhœa, and also as an astringent in indigestion, diarrhœa especially of children, and in asthma. Before being administered, they are usually buried in the earth to remove their bitter principle, then washed and lastly ground; dose 3 *mâshâs*. (Stewart.)

1200. *Q. lamellosa*, *Smith*, H.F.B.I., V. 606.

Vern.:—Shalshi, pharat-singhali, budgrat (Nepal); Búk (Lepcha).

Habitat:—Eastern Himalaya; from Nepal to Bhotan, the Nâga and Dâphla Hills, Manipur.

A very large, evergreen tree; wood very hard and heavy. Buds silky, young shoots with tawny, deciduous pubescence. Leaves elongate-elliptic, acute at both ends, sharply serrate to near the base, upper side glabrous, underside glaucous, with deciduous pubesence while young; blade 8-18, petiole 1-2 in long, secondary nerves 18-25 pairs, straight, impressed on the upper, very prominent on the under-side. Flowers sessile on short spikes; peduncles thick; cup very large, up to 3in. across, woody, with 10 thin, broad, loose lamellæ, enclosing the greater part of the nut. (Brandis.)

Use:—The bark and acorns are used in medicine. (Watt.)

1201. *Q. pachyphylla*, *Kurz*, H.F.B.I., V. 608.

Vern.:—Bara katus, Sungre katus (Nepal); Hlosiri, Kashok (Lepcha).

Habitat:—Sikkim; Manipur.

A large ever-green tree, leaves elliptic-lanceolate, long-acuminate, glabrous above, underside pale, with minute stellate hairs; mid-rib and nerves glabrous; blade 5-8, petiole $\frac{1}{2}$in; secondry nerves 8-10 pairs, impressed above, arching and anastomosing under the margin; spikes sometimes androgynous. Cups $1\frac{1}{2}$-2in. across, always confluent, forming large, irregularly shaped masses, more than half the nut enclosed in the cup. Nuts glabrous, shining, nearly globose. (Brandis.)

Use :—In Sikkim the bark and acorns are used medicinally as astringents. (Watt.)

1202. *Corylus Colurna, Linn.*, H.F.B.I., V. 625.

Vern. :—Urni (Jhelum); Winri, wiri, warawi, wúriya, thangi, thankoli (Kashmir and Chamba); Jangi (Chenab); Shurli, sharoli, ban pálu, geh, ban dilla (Sutlej); Kapási, bhotia badám (Kumaon); Shirol (Garwhal); Jhangi (Kangra).

Habitat :—Western Temperate Himalaya from Kashmir to Kumaon.

A moderate, rigid, gregarious tree, 40-50ft. high. Bark thin, dark. The scales of the bark often detaching themselves at the base and exfoliating upwards. Wood pinkish-white, moderately hard. Leaf-buds short, rounded in hoary, ovate scales. Leaves 3-6in. long, glabrous when mature, rather membranous, ovate or obovate, shortly acuminate; base cordate, unequally or doubly serrate, often slightly lobed, 5-8 by $2\frac{1}{2}$-6in. Lateral nerves 10-12 pair, straight, generally pubescent beneath, each terminating in a long tooth. Petiole 1-$1\frac{1}{2}$in. glandular-pubescent. Stipules $\frac{3}{8}$in. long, lanceolate, hairy. Flowers monœcious. Male flowers one in each bract; perianth 0. Stamens usually 4, filaments forked, separating the anther-cells. Spikes fascicled, 1-2in. long, cylindrical, drooping. Female flowers in pairs in the upper bracts of a small, many-bracteate bud-like spike. Perianth superior. Ovary 2-celled, 2-ovuled. Nuts 1-seeded. $\frac{1}{2}$-$\frac{7}{10}$in. long; somewhat compressed, hard, deep-brown, 2-3 together in a ribbed, coriaceous, double-involucre. (Kanjilal).

Uses :—The nuts are not uncommon in drug-seller's shops, being considered tonic. (Watt.)

N. O. SALICINEÆ.

1203. *Salix tetrasperma, Roxb.*, H.F.B.I., V. 626; Roxb. 712.

Sans. :—Búrum.

Vern. :—Bed, bent, baishi, bet (H.); Nachol (Kol.); Gada,

Sigrik (Santal); Bhesh (Garo); Bhi (Assam); Pani jama (Beng.); Laila, bainsnj (N.-W. India); Bis, bitsa, bakshel (Pb.); Yir (Kashmir); Valunj, bachá (Dec.); Atrupalai (Tam.); Etipála (Tel.); Atrapala (Mal.); Momakha (Burm.); Niranji (Kan.); Sufaida, badha (Sindh); Wullunj, bacha (Bombay); Boch, bach (M.); Dhanie (C. P.)

Habitat:—Throughout tropical and Sub-tropical India, from the Punjab eastwards to Mishmi, Assam and Munnipore and southwards to Travancore.

A moderate-sized, deciduous tree, 20-40ft. Bark rough, with deep, vertical, rough fissures. Wood red, soft, porous, even-grained. Flowering after leafing, trunk stout, attaining 10ft. girth, head large; branches sub erect. Young shoots and young leaves silky; branchlets and underside of leaves sometimes pubescent. Leaves 3-6in., glabrous, glaucous beneath, lanceolate, rarely ovate-lanceolate, minutely and regularly serrulate, acuminate. Lateral nerves numerous, prominent. Petiole ¼-1in. Stipules ovate or orbicular, deciduous. Peduncle leaf-leaving. Male catkins 2-4in., on leafy branchlets, sweet-scented; bracts obovate or spathulate, pale, hairy; stamens 5-10. Anthers minute. Female catkins 3-5in. long, bracts pale, smaller. Disk small, ½ annular. Capsules long, stipulate, glabrous or pubescent, in groups of 3-4. Pedicels as long as the capsule, $\frac{1}{10}$-$\frac{1}{6}$in. long. Stigmas 2, spreading, sub-sessile, generally entire. Seeds 1-6. Fruiting catkins, sometimes 5in.

Uses:—The bark is stated by Dalzell and Gibson (*Flora of Bombay*, p. ii., p. 82) to be of some account as a *febrifuge*. Mr. Long (*Journ. of Agri.-Hort. Soc of India*, 1858, vol. x., p. 43) states that the bark yields "a tonic substance." If by this he means *Salicine* (the crystalline principle found in some European species of Salix), he is under a mistake, as Sir W. O'Shaughnessy carefully examined this bark, and failed to detect any trace of this principle. (*Bengal Disp.*, p. 606). (Ph. Ind.)

1204. *S. acmophylla*, *Boiss.*, H.F.B.I., v. 628.

Vern.:—Bed (Afg.); Budha (Sind.); Bisu, bada (Pb.); Jalmâlâ (Dehra Dun.)

Habitat:—Himalayan Valleys, Sub-Himalayan tract and Siwaliks from the Ganges westward, Northern Punjab often cultivated. Afghanistan and Baluchistan.

A deciduous, middle-sized, handsome tree, quite glabrous, with flexuose branches, which break off easily from the stem. Young shoots and young leaves silky. Bark ½in. thick, rough, dark-brown, somewhat corky, deeply and irregularly vertically cleft. Wood soft, porous, even-grained; sapwood white. Trunk attaining 7ft. girth; branches often pendulous. Crown rounded. Leaves 2-8in. by ⅓-¾in., pale, those near the catkins much smaller, linear-lanceolate, upper caudate-acuminate, quite entire; lower often sub-acute or mucronate, glabrous and glaucous when mature; lateral nerves faint. Petiole ⅓-½in. Flowers after the leaves on short, leafy penduncles; bracts ovate or oblong, concave, villous. Male catkins 1-2in., cylindric, dense-fid. Female catkins 1in., nodding with deciduous, long haired bracts. Stamens 4-6; anthers short, globose; style short: stigmas 2, sessile entire, spreading. Capsule shortly stipitate, ovoid-oblong, glabrous. (Kanjilal.)

Use:—A decoction of the bark is used in Beluchistan as a febrifuge. (Murray.)

1205. *S. Caprea, Linn.*, H.F.B.I., V. 629.

Vern.:—Bed mushk (Pb.); Khwagawala (Pushtu); Khilaf (Arab).

Habitat:—Cultivated in Rohilkund and N.-W. India.

A large, deciduous shrub or small tree, 25-30ft., flowering before leafing. Trunk attaining 3-4ft. girth. Bark, dark-grey, or yellowish-brown, with irregular, longitudinal clefts and short cross clefts. Wood light-red, soft, even-grained. Leaves 2-4in., dark-green above, crenate, broadly elliptic or obovate, glabrous and more or less rugose above, grey, tomentose beneath; stipules large, reniform. Catkins densely silky, nearly sessile; male sweet-scented, ovoid-oblong, very stout, erect, 1-1½in. long; bracts tipped black; stamens 2, free. Female catkins 2-3in., slender, nodding; bracts tipped with black. Capsules downy, shortly stipulate. Stigmas sub-sessile.

Uses:—The flowers yield on distillation a scented water

which is highly valued as a medicine, being cordial, stimulant, and aphrodisiac, and is externally applied in headache and ophthalmia. The ashes of the wood are useful in hæmoptysis, and, mixed with vinegar, applied to hæmorrhoids. The stem and leaves are astringent, and the juice and gum are also used medicinally to increase visual powers. (Dr. Stewart.)

In Europe, the bark of this species of willow was at one time used as a substitute for Cinchona.

The leaves have been found useful in fevers in the form of a decoction. (Asst.-Surg. Bhagwan Das.)

The distilled water from the flowers is useful in palpitation of the heart. (Dr. Perry in Watt's Dic.)

The Persian settlers in India have introduced the flowers (bedmushk) and the distilled water (ma-el-khilaf) of S. Caprea, both of which are used by the upper classes of Mahometans and Parsees, who consider them to be cephalic and cardiacal and use them as domestic remedies in almost every kind of slight ailment. Raughan-i-bed, an oil prepared by boiling two parts of the distilled water with one of sesamum oil until the water has all evaporated, is a favorite remedy for cough. (Pharmacog. Ind.)

Chemical composition.—Willow bark has been shown to contain salicin, wax, fat, gum, and a tannin which gives with ferric salts a blue-black precipitate, the liquid becoming purplish-red on the addition of soda. Johanson (1875) has also shown the presence of a kind of sugar having a slightly sweet taste and reducing alkaline copper solution with difficulty, and of the glucoside benzohelicin, $C^{20}H^{20}O^{7}$. Salicin, a glucoside, crystallizes in colourless plates or flat rhombic prisms, but it usually occurs in commerce in white glossy scales or needles. It remains unaltered in the air, is neutral to test-paper, inodorous, and has a persistently bitter taste.

Bidenguebine or "willow honey," said to be derived from the leaves and young branches of a willow, and to have a feebly saccharine taste.

Bidangubin or "willow honey" has been examined by Raby (Union Pharm., May, 1886, p. 201). It affords about 12 per cent. of sugar, estimated as glucose, and a considerable quantity of a sugar crystallizing in opaque hard crystals like those of sugar of milk. It melts at 150° to a transparent liquid, and dissolves in 5·5 parts of water at 15° C. The formula is given as $C_{12}H_{22}O_{11}$. This sugar evidently possesses considerable affinity to melezitose, from which it differs, according to M. Raby, in not being efflorescent, and in the greater rotatory power of the glucose derived from it by inversion over that obtained from melezitose. The inversion by means of dilute hydrochloric acid also takes place more rapidly. He therefore proposes to call the new sugar bidenguebinose.

1206. *S. alba, Linn.*, H.F.B.I., v. 629.

Vern. :—Vivir (Kashmir); Bis, yur, changma, mâlchang, châmma, kalchan, chung, bûshan, madânu (Pb.); Bed-i-siah (Afg.); Kharwala (Trans-Indus).

Habitat :—Cultivated in the North-West Himalaya and Western Tibet.

A large, deciduous tree. Bark light-brown; wood white, pink or light-brown, soft, even-grained. Attains a height of 80ft.; flowering after leafing. Branchlets olive, green, yellow, red or purple. Leaves 2-4in., dull-green above, young silky on both surfaces, old glabrous, often glaucous beneath, narrow, lanceolate, acuminate, glandular-denticulate. Stipules silky, $\frac{1}{3}$-$\frac{3}{5}$in., falcately ovate or lanceolate, deciduous; petioles eglandular, $\frac{1}{10}$-$\frac{1}{2}$in. Catkins on leafy peduncles. Male cylindric, 1-1$\frac{1}{2}$in., dense-fid, drooping; bracts oblong, ciliate; stamens 2, free. Female 2-3in., lax-fid; bracts yellow or brown, ciliate. Dish scales 2. Capsules with narrowed tips, sub-sessile, ovoid, glabrous or pubescent; style very short; stigmas 2-fid.

Uses :—The bark yields salicin, a drug largely used in the treatment of acute rheumatism. It is recognised as antiseptic, antipyretic and antiperiodic.

1207. *S. babylonica, Linn.*, H.F.B.I., v. 629; Roxb. 712.

Vern. :—Tissi, bhosi (Nepal); Giûr (Kashmir); Bisa, bada katira, bidâi, bitsu bes, besu, wala, majnun, laila, bed maju (Pb.).

Habitat :—Cultivated in the plains of India, and the Himalaya and elsewhere in gardens, etc.

A deciduous tree, with pendent branches, 50ft. Trunk 12ft., in girth flowering and leafing together; males much commoner than females. Branchlets glabrous, shining. Buds thin, acute. Bark grey, $\frac{1}{4}$-$\frac{1}{2}$in. thick. Wood soft, porous, even-grained. Leaves 3-6 by $\frac{1}{2}$in.; midrib prominent, linear-lanceolate, acuminate, serrulate, glabrous or sparsely hairy; stipules falcate, serrate. Catkins very slender on leafy peduncles; males short, cylindric,

curved, slender, pale-yellow, ½-1in. long ; stamens 2, free; bracts lanceolate. Females : as long bracts as in the male, small pale. Capsules sessile, narrowly conic, glabrous or slightly hairy at base. Stigmas 2, sessile, entire

Uses :—The leaves and bark are considered tonic, possibly from the salicine in them (Stewart.) They are still much used by native practitioners as astringents and tonics, chiefly in the treatment of intermittent and remittent fevers. (Punjab Products.) The bark is also said to be anthelmintic (Watt.)

1208. *Populus nigra, Linn.*, H.F.B.I., v. 638.

Vern. —Sûfeda (Pb.) ; Frast (Kashmir), Prost, farsh, kramali, biûns, (Himalayan names); Yarpa, yûlatt, changma, kabul, kaull (Ladak)

Habitat :—Cultivated here and there in the N.-W. Himalaya, from Simla westward

A large, deciduous tree Bark thick, grey or blackish-grey, rough, with numerous characteristic, deep, vertical fissures Wood soft, even-grained ; sapwood white, heartwood reddish-brown. Gamble further adds :—"The variety of the Black Poplar, found in the Himalaya, is almost always the fastigiate form known as the Lombardy Poplar ; it is very common and conspicuous in avenues in Kashmir, and some trees are 90-100ft in height and 6 to 7ft in girth From the Kuram Valley, Aitchison and Hemsly have described a variety, *afghanica*, with slender branches and small leaves" Branchlets and leaves glabrous. Buds viscid. Leaves with penni-nerved midrib and 3 basal-nerves ; almost triangular, acuminate, crenate ; blade 2-4in. Petiole 1-2½in. long. Catkins glabrous. Males pink, stamens 15-30 Females lax, drooping, disk shallow ; pedicel short Fruiting catkins 4-6in. long.

Uses :—The bark is officinal in the plains, an *arak* [liquor] being extracted from it, which is considered depurative. (Dr. Stewart.)

In Tuscany, an ointment prepared from the buds is used for hæmorrhoids, and the balsam obtained from the same source is a popular remedy for colds. (Watt.)

1209. *P. ciliata, Wall.*, H.F.B.I., v. 638.

Vern :—Bangikat (Nepal); Sungribond (Lepcha); Garpipal (Kumaun); Chelun (Simla); Safeda, bagnu, asan, pahari pipal (Pb.); Palach (Pb.); Shodar (Pushtu); Piplás (corruption of Poplar), Biáon, Sharphárá, Tilaunja, Kapásil (Jamsar.)

Habitat :—Temperate Himalaya, from Kashmir to Bhotan.

A large, deciduous tree Bark greenish-grey, smooth when young, brown, with deep vertical fissures when old. Wood grey or brownish-grey, soft. Buds viscid, lanceolate, the yellow resinous gum sometimes secreted in large masses Leaves ovate-lanceolate, broad-ovate, as a rule finely ciliate along the edge, pale and often minutely pubescent beneath, denticulate, usually cordate, 3-6in by 2½-4½in, 3-5-nerved; lateral nerves 4-6 pairs above the basal, irregularly forked Petiole 2-5in long, compressed above Flowers before the leaves or with young leaves in lateral catkins, raceme-like and drooping. Male catkins 2-4in long, somewhat interrupted; Perianth bell-shaped. Margins undulate Stamens numerous, filaments free, short, slender; bract fringed, early caducous, ⅓in long Female catkins 6-12in long, lax in fruit. Pedicels as long as flowers Ovary conical, ovules along the centre of the valves Stigmas 3-4, nearly sessile, spreading, 2 lobed, disk toothed Capsule ⅓-½in long, ovoid, 3-4-valved, glabrous; seeds numerous. Stipes and hairs of the seeds as long as the capsules The female tree is common; the male is very scarce.

Use :—The bark is occasionally used as a tonic stimulant and purifier of the blood. (Atkinson)

1210. *P. euphratica, Oliv.*, H.F.B.I., v. 638.

Vern. :—Sufaida; Bahan (Sind) Padai (Baluch); Patki (Brhui); Hodung (Ladak); Sufaida; Junglee bentee (Pb.); Bahân (Pushtu); Pada, padak (Afg).

Habitat :—Common in the forest belt of Sindh along the Indus "Where subject to inundation, the lower part of the trunk often gets covered with short horn-like roots and shoots, hard spine-like processes are found projecting from the wood

into the bark." (Brandis.) Common also in the Punjab; and planted in the U. P.

A large, deciduous tree, usually gregarious. Bark thick, with irregular, vertical furrows. Wood moderately hard, compact, even-grained. Sapwood white; heartwood red, often nearly black near the centre. Height 40-50ft; trunk attaining 8ft. in girth. Extremities sometimes hoary, buds slightly pubescent, not viscid; branches terete Leaves polymorphous; "those of seedlings, young trees, pollard -and coppice-shoots linear, short petiolate, 3-6in long; those of older trees on branches, with short internodes, as a rule broad—ovate, rhomboid or cordate; blade 2-3in.; petiole 1-2in. The broader leaves are dentate, cut or lobed, while the narrow leaves are generally entire. Intermediate forms frequent on the same tree and on the same branch." (Brandis.) Catkins lax-fid. Male flowers:-- bracts oblanceolate, incised; disk orbicular, 8-cleft; stamens 8-12. Female flowers:--disk tubular, 8-12 cleft, membranous, caducous. Capsule turgidly lanceolate, ovoid, sub-sessile, 3-valved, ¼-½in., on a long, slender pedicel.

Use:—The bark is used as a vermifuge in the Punjab and Sind. (Stewart)

1211. *P. alba, Linn.*, H.F.B.I., v. 638.

Vern.—Chitta bagnu, safeda, jangli-frast, fras, chanûn (Pb.); Sperdor, spelda (Afg.); Fras (Kashmir).

Habitat: N.-W. Himalaya, from Kunawur westwards.

A lofty tree in Europe; in India exceeding 40ft. (Brandis.) Leaf-buds, shoots and leaves beneath, white with cottony tomentum. Leaves oblong—ovate or broadly ovate, dull-green above, or orbicular, sinnately lobed or toothed, palmately on young shoots; petiole 1-2in., laterally compressed. Base 5-nerved, more or less cordate; catkins hairy. Males 1½-4; stamens 6-10. Females slender shoots. Tips crenate, ciliate. Disk stellate; stigmas 2-2, partate; arms linear. Carpels pedicelled, 2-valved. Capsule 1in., shortly pedicelled.

Uses:—The bark contains some salicine and acts as a tonic; used for purifying the blood and in skin diseases. Bark said to be useful in strangury. (Punjab Products.)

N. O. GNETACEÆ.

1212. *Ephedra vulgaris, Rich.*, H.F.B.I., V. 640.

Vern :—Amsânia, Butshur, Chena (Pb) Khanda, Khama (Kunawar); Phok (Sutlej).

Habitat:—Temperate and Alpine Himalaya and Western Tibet in the drier regions, altogether 7-12,000 ft, 12-16,000 ft. in Sikkim.

A low-growing, rigid, tufted shrub, with usually a gnarled stem and erect green branches which are striate and nearly smooth. Bracts connate to the middle, not margined, ciliate, rarely produced into minute linear leaves. Spikelets ¼ to ⅓ inch, subsessile, often whorled; fruiting with often fleshy, red, succulent bracts, 1 to 2 seeded Seeds bi-convex or plano-convex. (Hooker.)

Uses:—The authors of *Pharmacographia Indica* write:—"A specimen of the Persian plant kindly furnished to one of us by Mr. K. R. Cama of Bombay, was identified at Kew as E. vulgaris. Dried branches of the Huma are still brought from Persia to India for use in Parsi ceremonial, and it is considered to have medicinal properties. The plant was used by the ancient Arians, and is probably the same as the Soma of the Vedas

* T. V. Biektine (Bolnitch. Gaz Botkina, 1891, No. 19, pp. 473—476) has brought to notice the use of a decoction of the stems and roots of E. vulgaris as a popular remedy for rheumatism and syphilis in Russia, and of the juice of the berries in affections of the respiratory passages. After administering the decoction himself in a number of cases of rheumatism, acute and chronic, he comes to the conclusion that the plant is especially valuable in acute muscular and articular forms of the disease: the pain is relieved, the pulse becomes less rapid and softer, and the respiration easier. Within 5 or 6 days the temperature becomes normal, the swelling of the joints disappears, and after about 12 days' treatment the patient is cured. In several cases marked diuresis was observed before or about the time that the temperature began to decrease; the drug was also observed to improve the digestion and promote the action of the bowels. In chronic cases the action of Ephedra was less marked, and

in two cases of rheumatic sciatica and osteo-myelitis hardly any effect was produced, but it is only fair to remark that antipyrine, salicylate of soda, antifebrine, salol, &c, also failed to afford relief in these two cases. The decoction used by Dr. Biektine was made with 3 85 grams of the drug to 180 grams of water. Kobert has shown that 0 20 gram of ephedrine injected into the veins of dogs and cats produces violent excitement, general convulsions, exopthalmia and mydriasis. (Nouveaux Remedes, Aug. 8th, 1891.) Pharmacographia Indica, III. 369-370.

The American aborigines of Pima use Teamster's Tea (Ephedra antisyphilitica, *Berland*) as a beverage. (B. D B.)

Chemical composition – Dr. N. Nagai (Tokio Chem Society, through Chem. Zeit., 1890, p. 441) obtainedthe alkaloid Ephedrine from the stem of Ephedra vulgaris (Ma-oh). Its composition is $C_{15}H_{10}NO$; by oxidation the alkaloid is split into benzoic acid, monomethylamine and oxalic acid. Isoephedrine, melting point 114°C., is obtained by heating ephedrine, melting point 30°C., with hydrochloric acid in a closed tube to 180°C. The constitution of ephedrine is $C^6H^4CH^2$ CH (NHCH³) CH^2OH, and that of isoephedrine is $C^6H^5CH^2C$ (OH) (NH CH^3) CH^3.

The hydrochlorate of ephedrine forms acicular crystals which are freely soluble in water Mr. J G. Prebble (1889) found the twigs of E vulgaris to contain 3 per cent. of a tannin, giving a whitish precipitate with gelatine and acetate of lead, and a greenish precipitate with acetate of iron (Pharmacographia Indica)

1213. *E. pachyclada*, *Boiss.* H.F.B.I., V. 641.

Vern. :—Hum, Huma, (Pers. Bomb.)

Habitat :—Western Himalaya, in the drier regions, and Western Tibet, from Garhwal westwards.

A rather tall shrub, more robust them *E. Vulgaris*, and more scabrid. Branches rather stout, erect, striate, scaberulous, bracts connate to the middle, margined, ciliate, anthers about 6 sessile or subsessile. I can find no good characters in the spikes and flowers except the more or less margined bracts (Hooker).

Uses :—The same as of E Vulgaris. The ashes are used as a snuff and dye in Afghanistan

N. O. CONIFERÆ.

1214. *Cupressus sempervirens*, *Linn.*, H.F.B.I., V. 645; Roxb. 678.

Vern. :—Sara, sarâs (Hind.); Farâs (Sind); Saruboke (Mar.).

Habitat:—Planted only in N.-W. India.

A tall, evergreen tree. Bark thin, light, peeling off in thin strips. Wood light-brown, moderately hard, close and even-grained. An ornamental tall tree, cultivated in gardens, attaining 100ft. and 9ft. girth of the trunk; branches and their tips erect, with the leaves 4-angled; crown narrowly cylindrical of drak-green foliage. Leaves ovate-oblong, convex, with a gland on either side. Anthers about 4; cones few, scattered, peduncled, 1in. diam., globose or oblong; scales of cone tubercled, 3-14, usually 1in diam, with a short, convex or keeled horn or boss. Seeds ovoid or oblong, nucleus angled

Uses:—Wood and fruit are regarded as astringent and anthelmintic. (Watt.) The fruit is prescribed as an aromatic stimulant in piles (T. N Mukerji)

1215. *Juniperus communis*, *Linn.*, H.F.B I., V. 646.

Vern.—Aaraar (Hind), Chichia (Kumaon); Nûch, pâma, pethra, bentha, betar (Kashmir); Petthrî, petthar, betthal wetyar, pâma, giâshûk, lassar, nûch, chûch, betar, dhûp, lewar, langshûr, thelu, gûgil, chûi, shûpa, fruit=haulber, abhûl (Pb); Langshûr thelu, lewar (Kunawar); Chûni, shuha (Spiti); Sbama (Lahoul); Abhal (Dec); Fruit=Abhal, habbul-aaraar, samratul-arraar (Arab.).

Habitat:—Western Himalaya, from Kumaon westward.

A dense, diffuse, ever-green shrub Leaves $\frac{1}{4}$-$\frac{3}{4}$in., in whorls of three, straight, spreading or erect; base narrowed, upper surface pale or white, concave; lower green, convex, or obtusely keeled beneath, with a more or less prominent cushion on branchlets, persistent 3-4 years Flowers axillary, supported by small, imbricating bracts; the male catkins ovoid, yellow, antheriferous; scales broad-ovate, acuminate. The females resembling leaf-buds Fruit globose, blue-black when ripe $\frac{1}{4}$-$\frac{1}{3}$in., very fleshy, ripening in August and September of the year after flowering. Seeds usually 3. Fruit sweet, aromatic, resinous, covered with a handsome, light bloom. Bark thin, reddish-brown, fibrous Wood white; heartwood yellowish or pale-red,

fragrant, moderately hard. In the Himalayas, the tree rarely attains more than 6-7ft. in height, often with a disproportionately thick stem, 18-24in. in girth.

Uses :—The fruit and the oil are officinal in the Pharmacopœias of India and Great Britain.

The nuts are sold in the bazars of Northern India for medicine, and are prescribed as diuretic and stimulant. Irvine mentions that they are imported into Patna from Nepal, and are used in the treatment of gonorrhœa. (Watt.)

"Juniper fruit and oil possesses carminative, stimulant and diuretic properties. They are useful in different forms of dropsies, either administered alone, or in combination with other diuretics. They have been used in mucous discharges as gonorrhœa, gleet and leucorrhœa; and in some cutaneous diseases. The wood has been regarded as sudorific in its action, and has been substituted for Guaiacum and Sassafras." (Bentley and Trimen.)

1216. *J. recurva, Ham.*, H.F.B.I., V. 647.

Vern..—Tupi (Nepal); Deschû, chakbu (Sikkim); Bettar, bhedâra, bidelganj, thelu, phulu, jhora, gûggal, bil, ûrûn, agâni (U. P.); Wetyar, bettar, chûch, thelu, phulu (Pb.); Pama (Tibet.)

Habitat :—Temperate and Alpine Himalaya.

An evergreen graceful, blue, glaucous tree attaining 30ft. or straggling, gregarious shrub. Bark brown, thin, peeling off in long fibrous strips. Wood moderately hard, very fragrant; sapwood white; heartwood light-red. (Gamble.) Branches fastigiate, decurved and ascending, with pendulous branches in large plants. Leaves subulate, imbricate, more or less depressed, in whorls of 3, ⅛in. long, lanceolate, pungent, back convex. Branchlets more or less 6-sided. Male catkins and bracts at the end of short lateral leafy branchlets, ovoid, Yellow. Females small, ovules erect. Berries ovoid, pointed, ⅓-½in. long, shining, dark-brown or blackish-purple when ripe. Seed 1, oblong, not winged.

Uses :—Aitchison reports that the smoke from the green wood is known in Kashmir as a powerful emetic, producing long continued vomiting.

1217. *J. macropoda, Boiss.*, H.F.B.I., V. 647.

Syn. :—J. Excelsa, *Brand.*, For. Fl. t. 68.

Vern. :—Dhupi, dhupri, chandan, shûpka (Nepal); Dhûp, padam, padmak, surgi (H.); Sûrgi, lewar, newar, dupri, chundan (Kumaon); Chalai, shûpka, shûr, shûrgu, lewar, luir (Pb.); Apûrz (Beluch.)

Habitat :—Inner drier ranges of the Himalaya from Nepal, westward.

A moderate-sized, ever-green tree. Bark thin, reddish-brown, fibrous, peeling off in thin, longitudinal flakes. Wood moderately hard, fragrant; sapwood yellowish; heart-wood red, with a purplish tinge. Height rarely 50ft, trunk short, but of great girth, usually 6-7ft, at times even more, 33 ft. Branchlets sub-distichous, slender. Leaves dimorphic, of the lower branches subulate, of the upper branches and branchlets, scale like. Foliage light and open; the scale-like leaves usually opposite, rhomboid, convex, obtuse, closely depressed up to the apex, with a large, resinous gland on the back, the subulate leaves opposite or in whorls, pungent, $\frac{1}{3}$in. long Male catkins on a scaly peduncle at the ends of branchlets, $\frac{1}{8}$-$\frac{1}{6}$in. long, closely set with imbricate scales. Berries sub-globose, bluish-black when ripe, very resinous; the tips of the scales forming transverse ridges or crests. Seeds 2-5.

Uses :—The fruit is used medicinally, and appears to have similar properties to that of J. communis. The smaller branches, when burnt, are supposed to exercise a deodorising and cleansing influence, and, in Khâgan, they are believed to act as a remedy for the delirium of fever.

1218. *Taxus baccata, Linn.*, H.F.B.I., V. 648.

Vern. :—Thûno, birmî, zirnub, birmí (Hind.); Rurmie, bhirmie, sugandh (Beng.); Dingsableh (Khasia); Teheiray sulah, tcheiray gulab (Nepal); Nhare (Tibet); Tingsohi, tsashing (Bhutia); Cheongbu (Lepcha); Thuner, geli, gallu, lûst (U. P.); Patr (Bomb.)

Habitat:—Temperate Himalaya, extending westwards to Afghanistan, and eastwards to Bhutan and Khasia Hills.

A large, ever-green tree attaining in the Himalayas 10ft. and 20ft. girth of trunk. Branches spreading. Bark thin, purplish-grey, peeling off longitudinally. Wood hard, close and even-grained, smooth; sapwood white, heartwood orange-red, light-red or white. Kanjilal says "though 'generally middle-sized,' the tree is sometimes very large, with a large spreading crown." Trunk short, branches horizontal, foliage dark-green. Leaves flattened, coriaceous, linear, distichous, 1-1½in. long, 1-nerved, narrowed into a short petiole, no resin canal. Flowers diœcious, on short axillary branchlets, which are densely clothed with imbricating bracts. Male flowers pedicelled, sub-globose, with numerous, peltate scales, each bearing on the underside 3-6 anther-cells, dehiscing longitudinally. Female flower a single, erect ovule, surrounded at the base by a disc which is membranous in flower, but enlarges into a red, fleshy cup, surrounding the seed, testa hard, embryo in the upper portion of the endo-sperm; cotyledons 2, thick, fleshy

Uses:—"The leaves contain a volatile oil, tannic and gallic acids, and a resinous substance called toxin. Yew leaves and fruits have been given for their emmenagogue, sedative and anti-spasmodic effects. Pereira says that therapeutically the yew appears to hold an intermediate position between Savin and Digitalis, being allied to the former by its acrid, diuretic and emmenagogue properties, and to the latter by the giddiness, irregular and depressed action of the heart, convulsions and insensibility, which it produces. Yew is, however, reported to have one decided advantage over Digitalis by its effects not accumulating in the system, so that it is a much more manageable remedy than Digitalis. Besides its use as an emmenagogue and sedative in the same cases as Savin and Digitalis are administered, it has also been employed as a lithic in calculus complaints; and as an anti-spasmodic in epilepsy and convulsions. According to Dr. Taylor the yew tree is sometimes used by ignorant persons to cause abortion. At the present time, yew is never used in regular medical practice in Europe,

the principal interest attached to it having reference to its poisonous properties. Thus, the leaves and young branches act as a narcotico-acrid poison, both to the human subject and to certain animals, but more especially to horses and cows. Fatal cases of poisoning have also occurred from swallowing the fruit. It is frequently stated that animals may feed upon the young growing shoots with impunity, but that, when these have been cut off, and left upon the ground for a short time, they are, then, poisonous This is an entirely erroneous notion for yew shoots and leaves are poisonous both in a dried and fresh state. It seems certain, however, that the red, succulent cup of the fruit is harmless, for a fatal case of poisoning has been recorded of a child from swallowing the entire fruit with its contained seed; whilst other children, who had partaken of the fruit at the same time, but who had rejected all but the fleshy cup, suffered no ill-effects." (Bentley and Trimen)

Dr. Dymock informs me that the dried leaves and twigs of this plant constitute the *talispatr* of the Bombay bazars and druggists' shop. While this is, no doubt, correct, it is rather surprising that the plant Taxus baccata, in no vernacular, bears the name *Talisa*, a fact that would point to the name *talispatr* as but of modern application. Gamble says. "the bar, is used in Kunawar as a substitute for, or mixed with, tea, the berries are eaten, and the leaves are exported to the plains as a medicine." In Europe, the berries are (as already stated) regarded as poisonous, but, in Manipur, I have seen them eaten. The tree is common on the mountains bordering on Burma and the Naga Hills. A twig is worn by the young unmarried Naga females as a charm to prevent pregnancy--chastity being exceptional before marriage. It is remarkable that, in Bengal, the *talispatr*, as sold in the bazar, should be an Abies, a plant possessed of carminative, expectorant and stomachic properties, while, in Bombay, it should be the poisonous leaves of the yew which possess emmenagogue, sedative and anti-spasmodic properties. *See* Abies Webbiana. (Watt.)

In Northern India, the leaves are largely employed for medicinal purposes, under the name of *birm* or *brahmi*, chiefly

as a remedy for indigestion and epilepsy and as an aphrodisiac. (Irvine.) The bark is used by Kunâwaris as a substitute for tea (Kanjilal.)

The pulp of the ripe fruit is non-poisonous; the kernel contains the taxin. This substance is prepared from its satd soln. in very dil Na Cl soln., by Na Cl. NH_3, NaOH, phospho tungstic acid, phospho-molybdic acid, potassium mercuric iodide, KI_3, Esbach's reagent, Au Cl_3 and $(NH_4)_2SO_4$. With concd. H_2SO_4, it gives a red color, and with Killiani's reagent a red ring; $KMnO_4$ is decolorized in both acid and neutral soln In $CHCl_3$ with a layer of concd. H_2SO_4, a brown ring is formed. The unripe fruit is, perhaps, more poisonous than the ripe. Taxin is not toxic to fish. Rabbits, guinea pigs, and cats, if the dosage is cautiously increased, can stand many times the lethal doses subcutaneously without harm. These animals thus become comparatively immune to this poison very quickly Game and cud-chewing domestic animals stand moderate amts. of yew needles without harm, horses and other solipeds, though more susceptible, likewise soon easily accustom themselves to taxin. It may be extracted from the wine, into which it passes unchanged, by Et_2O, after adding Na_2CO_3. The action of taxin consists in motor excitation of the central nerve system followed by paralysis (Chem. Abst., Sept. 10, 1915, p. 2403)

The alkaloid, taxine was obtained from the green leaves and the air-dried leaves. Its formula is $C_{37}H_{52}O_{10}N$.

The physiological action of taxine was examined in 1876 by Borchoro, who states that, when administered to frogs, rabbits, cats and dogs, it depresses the action of the heart and interferes with the respiratory functions, and that death ensues from suffocation in a short time. It has been asserted, however, that taxine has no action on guinea pigs Further experiments are required to establish definitely whether the alkaloid is actually poisonous, and if so, how it acts, and whether, as alleged, certain animals are immune to it (Thorpe & Stubbs, J. Ch S 1902, p. 880.)

Autumn-gathered leaves of male and female trees have been investigated. The alkaloid was extracted by digesting the powdered air-dried leaves with 1 per cent. Sulphuric acid for five or six days. The acid liquid was strained and pressed from the leaves, and at once, without concentration, rendered alkaline and extracted with ether. Taxine was obtained in the form of very fine glistering particles by crushing down the residue from the ether extract. It gives precipitate with most of the alkaloidal reagents, and colour reactions with strong sulphuric acid alone, and when this reagent is mixed with nitric acid, molybdic acid, or chromic acid (Y. E. Thorpe & G. Stubbs Proc. Ch. S for 1902, p. 128.)

1219. *Pinus longifolia*, *Roxb.*, H.F.B.I., V. 652; Roxb. 677.

Sans.:—Sarala, oleo-resin=sarala drava, sricâsa, kshira.

Vern.:—Salla, saral, chîr, chîl, oleo-resin=ganda-biroza, chîr-kâ-gond (Hind.); Dhûp, sala, dhûp, sula, oleo-resin= dhup,

koto (Nepal); Gniet (Lepcha); Teadong (Bhutia); Kolan, chîr salla, sapin, kolon, kolain, seed=kalghoza, chalhatti (U.P.) Dhûp (Oudh); Chîr, salla, sapin, kolon, kolan, kolais (Kumaon) Salla, sarl (Kashmir); Chîr chil, drâb chîr, nashtar, nakhtar ranzuru, gula, thansa, anandar, saral, oleo-resin=ganda-biroza, purified oleo-resin=biroza, sat-bîroza (Pb.); Nashtar, nakhtar Pushtu); oleo-resin=Gandah-birozah (Bomb.); Oleo-resin=Birozeh (Pers.).

Habitat:—Drier Himalayan slopes, from 2,000 to 7,000 feet above sea level.

A large, more or less deciduous tree, eminently gregarious, attaining 100-110ft., but often stunted and gnarled. Trunk usually naked, rarely 12ft girth. Bark 1-2in. thick, reddish brown outside, dark-red within, cut by deep fissure into large plates of irregular size, but more or less rounded and on an average about 6in. across. Wood moderately hard; sapwood white; heartwood light reddish-brown (Gamble) Branches symmetrically whorled, high up the trunk, forming a rounded head of light foliage. Leaves 9-12in. long, slender, nearly triquetrous; sheath ½-1in. long, greyish-brown, imbriate, persistent. Male catkins ⅓-½in. long, cylindric; cones on short stiff stalks, spreading or recurved, solitary or in whorls of 2-5, 4-8in. long, diam. 3-5in.; scales 1-2 by ⅔in; beak thick, pyramidal, pointed and somewhat recurved. Seeds oblong, ½-1in. long, with the unequal-sided, thin, membranous wing, which latter is rather longer than seed. Cotyledons about 12.

Uses:—The people of Upper India obtain from it tar and turpentine. The former is said to be equal to that obtained by a more refined process in Europe; and the turpentine is stated merely to require attention to render it equal to the imported article. Dr. Hugh Cleghorn (*Jour. Agri.-Hort. Soc. of India*, 1865, vol xiv., p. i., App. p. 7) speaks of the product being of a superior description, equal, in fact, to Swedish tar. In an economical point of view, this subject may be worthy of attention. (*Ph. Ind.*) *

* Mr. Puran Singh [illegible] of opinion that the oil

Internally, the resin is used as a stomachic and externally as a plaster, and is applied to buboes and abscesses for suppuration. The wood is considered stimulant, diaphoretic and useful in burning of the body, cough, fainting and ulcerations.

"The resin is stimulant both externally and internally. Internally, it acts chiefly on the mucous membrane of the genito-urinary organs, and is, therefore, a very good remedy for gonorrhœa. I have used it with success in many cases of this disease, and in a few, with decided benefit, after the failure of copaiba, cubebs, gurjan balsam and turpentine. Dose: from one to three drachms in emulsion with mucilage, four times in 24 hours. As it is very thick, it requires to be mixed well and gradually with the mucilage." (Moodeen Sheriff.)

The resin oil forms a white, rather tough, opaque mass and has a granular structure which is probably due to partial crystallisation of the resin acid. Its odor is extremely pleasant and somewhat resembles that of limestone It has a Sp. Gr. 0·990, $[\alpha]_D - 7°42'$, acid number 129, ester number 11, and saponification number 140 When distilled with steam, it yields about 18·5 per cent of a volatile oil, which has the characteristic odour of pinene and a somewhat fainter odour of limonene. The oil has a sp. gr 0·866 and $[\alpha]_D + 2°48'$. When fractionally distilled, it yields (1) 56 per cent. of a liquid which boils at 165-170° and has $[\alpha]_D - 2°$; (2) 20 per cent which boils at 170-175° and has $[\alpha]_D + 2°48'$; (3) 9 per cent. which boils at 175-180° and has $[\alpha]_D + 6°50'$; and (4) 15 per cent. which boils at 180° and above and has $[\alpha]_D 180°12'$. The oil probably contains *l* – pinene together with a small quantity of *d* – limonene. The presence of pinene was detected in the first fraction by means of amyl nitrite, but a crystalline nitroso-chloride was not isolated. Attempts to prepare the hydro-chloride and bromine additive compound also failed. The white, crumbly resin which remains after distilling the oil has acid number 142, ester number 13, and saponification number 155; a 10 per cent. solution in a 100 mm tube has $\alpha_D = 1°10'$. Crystals of a resin acid melting

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P. Khasya, *P. Merkussi* and *P. excelsa*. The oil from this species, owing to its different chemical composition cannot come up to the American and French oils consisting mostly of pinene, but if prepared by adopting better methods of distillation, it is better than the Russian turpentin oil and is not inferior to the American oil when used for paints, varnishes, &c.

According to Messrs Morrison & Co., who examined, and reported on, a sample of oil distilled by Mr. Fernandez at Nainital the results of its application in cases of rheumatism were as good as those obtained with French oil.

This species is not only abundant in its natural habitat, but has been planted more or less successfully in various Indian plain stations, even in [redacted]. Mr. R. S. Troup has recently published in the *Indian Forest* [redacted] results of his sylvicultural study of this plaint.

at 138-140° separate from the solution of the resin in glacial acetic acid after remaining for 24 hours. (Frank Rahak, *Chem. Centr.* 1905)—J. Ch. S. LXXXVIII., Pt. II., p. 911.

1220. *P. Khasya, Royle*, H.F.B.I., V. 652.

Vern. :—Dingsa (Khasia).

Habitat :—Khasia and Chittagong.

A large, ever-green tree, 100-150ft. in Khasya, in Burma even 200ft., with a trunk 10ft. in girth. Bark thick, with deep cracks. Wood very resimous, moderately hard, pale-brown to red. Resin-ducts numerous in the outer and middle belt of each annual ring. Leaves 6-10in. long, slender, green, serrulate; back convex; sheath persistent, grey, lacerated at apex, $\frac{1}{2}$-$\frac{3}{4}$in Cones solitary or in pair, sometimes in threes, ovoid, 2-3in. long, greatest diam. 2in. Peduncle bracteate. Young cones recurved; beak of scales depressed, pyramidal, with a blunt knob at the end, wings round, topped, 4-times the length of the seed. Seeds $\frac{2}{3}$in., together with the wing.

Use :—This species also yields Oil of Turpentine, which according to the report of Professor Armstrong, F. R. S., corresponds in properties with French Oil of Turpentine.

1221. *P. Gerardiana, Wall.*, H.F.B.I., V. 652.

Vern. :—Gonober, rhi, newr, seeds=chilgoza, neoza (H.), Ronecha, rolecha (Kumaon); Rhi, shangti (Kunawar); Chuu, prita, mirri, galgoja, galboja, kashti, rhi, neoza, shangti, newr, ruminche, roniunchi (Pb.).

Habitat :—Dry interior valleys of the N.-W. Himalaya, from Kunawar westwards and in Garwhal.

A moderate-sized, ever-green tree. Bark very thin, grey, smooth, exfoliating in large, thin scales, leaving rounded shallow depressions, cracked only in very old trees. Wood hard, very resinous; heartwood yellowish-brown. Resin copious. Branches not whorled. Girth 12ft. sometimes. Height 50ft., sometimes 60ft., in congenial soil with proper space to develop its peculiar beauty, it becomes a regular dense, conical tree. Foliage beautifully dark-green, says Brandis. Leaves in trees stout, stiff, 3-5in. long; back rounded, persistent for 3-4 years, serrulate; sheath deciduous, $\frac{1}{2}$in., entire. Bracts deciduous. Male-catkins $\frac{1}{3}$-$\frac{1}{2}$in.

long, diam. 4-5in.; poduncle 1in. Scales broad; beak stout, recurved, obtusely triangular. Seeds irregularly cylindric, 1in. long, oily, edible; wing short, caducous.

Uses:—The seeds are considered anodyne and stimulant. The oil extracted from them is highly esteemed for its stimulating and healing powers when applied as a dressing to wounds, ulcers, etc. It is also said by Stewart to be employed as an external application in diseases of the head. (Watt.)

The seeds yield 30·7 per cent. of a very viscous, greenish-yellow oil. Grimme (1911) obtained the following constants: Specific gravity at 15°, 0·9307; solidifying point—17°; acid value, 1·6; saponification value, 191·8; iodine value (Wijs), 118·3. Fatty acids, 91·46; unsaponifiable matter, 1·64; melting point, 0°; solididying point—3°; iodine value (Wijs), 125·0; neutralisation value, 196·7; mean molecular weight, 285·2.

1222. *Cedrus Libani*, *Barrel*, *var. Deodara*, *Hook.*, H.F.B.I., V. 653.

Syn.:—Pinus deodara, *Roxb* 677.

Sans.:—Devadâru, Sarala.

Vern.:—Deodar (H.; Dewdar, geyâr, kelu, pallur, dadâ (Pb.); Devadâru (B.); Devdâr, vânseo-deodar (Guz.); Devadârû (Mar.); Devadâru-chedi (Tam.); Devadâru-chettu (Tel.); Devatâram (Mal.); Devadâri-marâ (Kan.).

Eng.:—Deodâr, Himâlayan Cedar.

Habitat:—N.-W. Himalaya, from Kumaon westwards.

A horizontal-branched tree, leader and young branchlets pendulous or drooping. Bark brown with a whitish lustre. Branchlets somewhat tuberculose from the persistent bases of the fasciculi of leaves. Leaves growing on branches in tufts 20-60 in number. Young twigs have no tufts, but solitary. Each tuft may be called an arrested bud; young leaves light-green and glaucous, and dark-green as they become older, triquetral (midrib being prominent on the inner side and rounded on the back) stiff, perennial, ½-2in. long, acicular, acute; stomata about 4 rows of each side of the inner side, and one or two lines of stomata as sometimes only a few irregular scattered stomata on the rounded or outer side. Male catkins numerous, solitary at first, oblong, oval and obtuse, afterwards more

cylindrical. Stamens sub-cylindrical, bilocular, with triangular, terminal, oblique scale. Female cones at first sessile, solitary, of a cylindrical form, of a pea-green colour, covered with a delicate, velvety, bluish bloom. As they advance in growth, they stand erect and solitary in a small peduncle on the upper side of the branches and become brown. They are oval, very obtuse, 2-5in. long, 1-2½in. diam. In their early green stage, most deliciously fragrant. Scales very broad, transversely oblong, flat, fan-shaped, ferruginous, entire, smooth and thin at the edges and somewhat membranaceous. Seeds unequal, somewhat wedge-shaped, with a large, obovate-membranous, brown wing, expanding suddenly on the thinner side, immediately beyond the seed. The majority of male catkins and female flowers are on separate trees. But a considerable number of trees also produce both male and female flowers on the same individuals. The usual girth is from 24-30ft., at times 33-36ft., 4 or 5ft. above the ground Height 160-180ft, or even 200ft (Vol III P. 225, Pinetum Britannicum Blackwood and Sons, Edinburgh and London, 1884)

Sir Joseph Hooker says (Natural History Review, 1862, p. 17). "It is evident that the distinctions between Cedrus Deodara, Cedrus Libani and Cedrus Atlantica are so trifling and so far within the proved limits of variation of conifera plants that it may reasonably be assumed that all originally sprang from one. It should be added that there are no other distinctions whatever between them of bark, wood, leaves, male cones, anthers or the structure of these, nor in the mode of germination or duration; the girth they attain or their hardiness (the assumed distinctive characters between the Deodar and Lebanon Cedar that were formed on the form of the cones, the falling away of their scales, the shape of the leaf in section, the wood, its odour and durability having all been satisfactorily disproved long ago. * * * Though the differences in the scales and seeds of Deodara and Libani are very marked, they vary much, many forms of each overlap, and further transitions between the most dissimilar may be established by intercalation of seeds and scales from C. Atlantica.... ....My own impression

is that they should be regarded as three well-marked forms, which are usually very distinct, but which often graduate into one another, not as colours do by blending, but as members of a family do by the presence in each of some characters common to most of the others, and which do not interfere with, or obliterate, all the individual features of the possessors" With regard to these observations of Sir Joseph Hooker, the Author of Pinetum Britannicum makes the following remark, which is worth reproducing here It runs thus ."Sir Joseph Hooker very accurately points out the true nature of the relationship of the three Cedars, although it may not be easy to say whether he most inclines to hold them as *species or varieties.*" (The italics are mine K. R. Kirtikar)

The Author of Pinetum Britannicum says that C. Libani, *Loud.*, is a closely-*allied species*

To show the differences between Cedrus Deodara and C. Libani, we have inserted a drawing of the latter on Plate No. 928A. Cedrus Libani is not indigenous to India—(K. R. K. & B. D. B)

Uses·—By Sanskrit writers, the aromatic wood is considered carminative, diaphoretic, diuretic and useful in fever, flatulence, dropsy, urinary diseases, etc It is chiefly used in combination with other medicines. (Dutt)

It yields a coarse, very fluid kind of turpentine (*Kelon kâ tel*, Hind.), held in much esteem by the natives as an application to ulcers and skin diseases It appears also to enter largely into their nostrums for the treatment of leprosy (Prof. H. H. Wilson, *Calcutta Med Phys. Trans*, vol. i., p. 41). Dr. Gibson regards it as very effectual in this disease when given in large doses. In the 2nd volume of these Transactions, Dr. J. Johnston details a severe case of lepra mercurialis, treated externally and internally with Deodar oil, extracted by heat from the wood. Commenting on this case, Dr. Johnston remarks that the Deodar oil produced the happiest effects by suddenly checking and ultimately curing the disease. A drachm of the oil was as large a dose as the patient's stomach could bear. It always acted as a diaphoretic, and produced

no other sensible effects. It was found extremely variable in its action, in some a drachm causing vomiting, whilst in others half an ounce induced only slight nausea. Dr. Johnston extended its use to other skin diseases with advantage. Dr. Royle (op cit., p. 352) states that the leaves and small twigs of the Deodara are also brought down to the plains, being much employed in native medicine. They may, doubtless, possess some mild terebinthinate properties (Ph. India.)

In Kangra, the wood is pounded with water on a stone, and the paste applied to temples to relieve headache. (Stewart.)

The wood is bitter, useful in fever, costiveness, piles and pulmonary complaints (S. Arjun.)

1223. *Abies Webbiana*, *Kindley*, H.F.B.I., V. 654.

Vern :—Palûdar, rewari (Jhelam), Bûdai, bûdai, tûng (Kashmir); Dhûnu râg, rail, pe, re, salle, saia (Chamba), Tos (Kulu); Spun, pun, krok, kalrei (Kanawar); Morinda (Jaunsar); Bang, dodhma, râgha, teliya or chili rîgha (South-Eastern Garhwal); Raunsla or râi salla (Kosi River), Râgha, râo râgha, ransla, raisalla (Kumaon), Gobria, sulah (Nepal), Dumshing (Bhutia.)

Habitat:—Temperate and Sub alpine Himalaya.

An ever-green tree Bark greyish-brown, rough. Wood white, soft. "Attains 150ft Girth of trunk 30ft, says J. D Hooker "Usually stunted and gnarled" (Brandis) Josiah Hoopes, of Philadelphia, in his Treatise on Coniferæ, New York, 1889, says "A Webbiana is a native of the Himalayas and the Alps of Goosainthan in Nepal at elevations from 9,500 to 12,000 or 13,000ft, where it attains to the height of 70 or 80ft., forming a large, pyramidal-shaped tree, with broad, spreading branches, and in adult specially with a rather tabular formed top" Kanjilal describes the plant thus:—"A lofty tree, with a densely, cylindric crown pre-eminently shade-enduring; branches pendular; branchlets stout, stiff, spreading horizontally; bark, on young stems, dark-brown or grey; and split into long and narrow scales on old trees. Leaves 1-2 by $\frac{1}{10}$in., narrow-linear, narrowed into a short petiole, spirally arranged, but declinate on two sides to appear distichous, glossy, dark-green above,

with two faint, white lines either side of the midrib beneath, persistent for at least 3 years; tip emarginate, generally with two sharp cups. Cones always erect, oblong or cylindric, 2-4in. long, 1½-3in. diam., dark-purple when ripe; scales closely imbricate, obovate; edge round. Seeds ⅛-⅓in. long, obovoid; wing twice as long broadly obovate, truncate; cotyledons 5-6." (Kanjilal's Forest Flora of Sewalik, etc., p. 434, 2nd Edition, Calcutta, 1911.)

Uses:—The dried leaves of this plant (Talispatra, Hind. and Beng., Talispatra, Sans.) are regarded as carminative, expectorant, stomachic, tonic and astringent, and useful in phthisis, asthma, bronchitis and catarrh of the bladder. The powdered leaves are often given along with the juice of Adhatoda Vasica and honey, and a confection called taliâdya churn is prepared from the talispatra along with pepper, ginger, bamboo, manna,

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*According to Ainslie and the earlier writers on Indian Economic Botany, talispatrie, talisapatra (Dec and Hind.); and talisha, vidara (Sans.) were the vernacular names for the dried leaves and twigs of Flacourtia cataphracta, the paniyala of Bengal. (Ainslie II, 407.)

Mr. Gamble, in his Manual of Indian Timbers, p. 17, gives talispatri as the Hindi name for Flacourtia cataphracta, Roxb., and this is also the name given by Babu T. N. Mukharji in his Amsterdam Catalogue. I have examined many specimens of the talispatra of our native druggists' shops in Bengal, and they have uniformly been the leaves and twigs of Abies Webbiana. Dr. U. C. Dutt writes to me to say that this is also his experience, and that he is of opinion that this is the talispatra of the ancient Sanskrit writers. It seems difficult to account, however, for a man of Dr. Ainslie's ability mistaking the ovate leaf of a Flacourtia for the needle-shaped leaves of a Pine, and having few or no authors to compile from, he must have personally identified the plants of which he wrote.

It is probable that the dried leaves of several plants, according to the part of India where met with, receive the name of talispatra, provided they are found useful in the treatment of coughs. It seems likely, however, that the leaves of Abies Webbiana are the original or true talispatra. Dr. Dymock informs me that the talispatra of the Bombay shops (also called Birmi) consists of the leaves and young shoots of Taxus Baccata, Linn.

The description of the talispatra in old books of Indian medicinal plants would agree very well with the leaves of a Cinnamomum, much better, in fact, than with those of an Abies. Dr. Moodeen Shariff gives talishapatri as the Tamil and Telegu names for C. Tamal, Nees, and also the Arabic and Persian for the leaves of that plant. He may be quite right in this opinion, modern usage having appropriated the name to Abies. (Watt.)

cardamoms, cinnamon and sugar. The talispatra also enters into the preparation of numerous complex prescriptions. (U. C. Dutt's Hindu Mat. Med.) Dr. F. Hamilton says the Hindu Doctors of Behar use an infusion of talispatra in the treatment of hoarseness. Hakims affirm that the gum, mixed with oil of roses, when taken internally, produces intoxication. This mixture is used externally for headache, neuralgia, &c. The juice of the fresh leaves is used as a family medicine in fevers, acting as an anti-periodic, for infants, dose 5-10 drops in water or mother's milk. It is also prescribed in affections of the chest and during dentition In Bengal, it is given as a tonic after parturition.

N. O. ORCHIDEÆ.

1224. *Dendrobium Macraei, Lindl.*, H.F.B.I., V. 714.

Vern. :– Joivanti Jiban, Sag (H.), Jibai, Jibanti (B.); Jivanti (M. and G.)

Habitat :—Sikkim Himalaya, Khasia hills, Deccan, Kanara, Nilgiri Hills

Rootstock creeping annulate Stems pendulous 2-3ft., branches ending in fusiform pseudo bulbs 2-2½in long. Leaves 4-8in., linear-oblong, obtuse, sessile Flowers 2-3, shortly peduncled, ¾-1in. long, white; pedicels ¾-1in long Sepals and petals erecto-patent linear-lanceolate acute, mentum short conic Bracts basal, sheathing; side-lobes of lip oblong obtuse, sprinkled with red; mid-lobe variable, small with 2 diverging lobules crenulate and crisped, disk between the side-lobes with 2 fleshy crests.

Uses :—This plant is the Jivanti of Sanskrit writers. In the Nighantas it bears the synonyms of Jivani, "life-giving," Jîva "life-giving," Jivaniya "supporting life," Jiva-śreṣhtha, Sâka-śreṣtha "best of herbs," and Yasas-vini "renowned." It is also spoken of as Jiva-bhadra and Maṅgalaya "auspicious," and is described as cold, mucilaginous, light, strengthening, and tridoṣha-ghna, *i.e*, a remedy for the disorder of the three humors of the body, bile, blood and phlegm, known to Hindu

physicians as tridoṣha. The whole plant is used in decoction along with other drugs supposed to have similar properties; it must not be confounded with Jivaka, one of the Aṣhtavarga, which is a drug unknown to the modern Hindus. D. Macraei does not appear to have been noticed by any of the European writers upon Indian Materia Medica. (Pharmacogr Ind. III 390.)

The authors of the *Pharmacographia Indica* have isolated from the dried roots and stems, an alkaloid which they have provisionally named *Jibantine* and two acids *A* and *B* Jibantic acid

1225. *D. chlorops Lindl*, H.F.B.I., V. 719.

Vern. :—Márávar (Malabar).

Habitat.—The Deccan peninsula, from the Concan to Malabar. "In the Thana District I have found it growing on branches of mango trees in the rainy season." (K.R.K.).

Stems tufted, 12-18in long, usually slender. Leaves on last year's shoots 2-4 by ¼-½in, lanceolate, acute, the second year's shoots leafless and flower-bearing Flowers ¾in. in diam., with a primrose-like scent when first expanded, in lateral and terminal racemes 3-6in long; pedicels and ovary together reaching ½in. long in flower, slender; bracts below the pedicels ⅛in. long, ovate-lanceolate, acute Sepals cream-colored; lateral sepals ⅜in. long by ⅛in. broad at the base, oblong-lanceolate, subacute; dorsal sepal ⅜in. long, less than ⅛in. broad, oblanceolate, obtuse. Mentum conical, ⅓in long. Petals ⅜ by ⅓in., cream-colored, obovate Lip flat, rather more than ⅜in. long; side lobes small, rounded, greenish; mid-lobe large, subquadrate, cream-colored; disk pubescent with a channelled ridge. Column greenish · anther white Fruit not seen. (Cooke.)

Uses :—The entire plant, recently gathered, chiefly its juice, when given internally, cures all kinds of stomach ache, excites bile and acts as a laxative to the intestines. (Rheede, translated from Latin by K.R.K.)

1226. *Eulophia campestris, Wall.*, H.F.B.I., VI. 4.

Vern. :—Salib-misri (H. B. and Pb.); Bongataini (Santal); Hatti-paila (Nepal); Sálum (Guz.); Sung-misri (Per.);

Habitat :—Plains of India ; from the Punjab to Oudh, Bengal, Chittagong, and the Deccan.

Roots tuberous; hypogæal. Leaves elliptic-lanceolate. Scape 6-18in., stout or slender, unbranched, from a deformed tuber. Sheaths sub-suppressed, acute. Flowers many, subsecund appearing before the leaves. Racemes many-fid. Sepals $\frac{1}{2}$-$\frac{3}{3}$in., linear-lanceolate, acute 5-7-nerved, slightly attached to the base of the lip, acute or acuminate, yellow or green, striped with pink. Petals oblanceolate, 3-5-nerved, narrower. Lip as long as the sepals, cuneate-obovate or oblong ; side-lobes short, mid-lobe orbicular, usually purple. Spur conical. Disk with 3 central nerves lamellate at base and tubercled and spinulose on the mid-lobe. Column rather slender. Capsule $\frac{3}{4}$in., ellipsoid.

Use :—It furnishes *Salep* which is esteemed as a tonic and aphrodisiac.

1227. *E. nuda Lindl.*, H.F.B.I., VI. 5.

Vern. :—Ambarkand (H.).

Habitat :—Tropical Himalaya, from Nepal eastwards, Assam, the Khasia Hills, and Mainpur ; the Deccan Peninsula, from the Concan southwards.

Roots tuberous hypogæal ; tall. Tuber large. Leaves 10-14in., elliptic-lanceolate, very variable in breadth. Scape 1-3ft., stout. Sheath appressed ; bracts scarcely equalling the ovary. Sepals 1in. Mentum rounded or conical. Lip shorter than the sepals. Capsule 1$\frac{1}{2}$in., fusiform. Flowers large, green or purple.

Uses :—It furnishes salep. Sir George Watt, in his work "Commercial Products of India," p. 963, writes regarding *Salep*, that

The article obtained in the Indian bazars has been ascertained to be chiefly the product of several species of Eulophia, *viz.*, E. campestris, E. nuda and E. virens (*mankand* or Lahore salep of the shops), though probably also from the species of a few other genera, and is produced on the hills of Afghanistan, Baluchistan, Persia and Bokhara ; but the Nilgiri hills and Ceylon are said to furnish part of the Indian supply. The salep of European commerce is procured chiefly from the Levant, and to some extent from Germany, etc., derived mainly from the tubers of Orchis mascula. The tubers are dug up after the plant has flowered, and the plump, firm ones are washed and set aside, and subsequently strung on threads, scalded, and dried in the sun or by artificial heat. The commercial article is met with in three forms– palmate, large ovoid, and small ovoid.

Various substitutes are sold in India. The kind known as Royal Salep (*bádshah salab*) has been identified as being derived from a species of Allium (A. Macleanii, *Baker Bot Mag.*, t. 6707; Aitchison, *Annals of Botany*,, 1889-90, iii., 149-55) : while the tuberous roots of Asparagus adsendens (West Himalaya and Punjab) and of A. racemosus (Deccan) are the white *musali*, Curculigo orchioides, the black *musali* and certain species of Habenaria are also so used. Besides these substitutes, an imitation salep, made of potatoes and gum (known as *banawati salab*), is largely manufactured for the Indian market

A considerable Trans-frontier trade exists in salep from Afghanistan, Persia, Baluchistan and Bokhara into India. A little trade is also done in collecting and drying in India itself, mostly Kashmir and Lahoul, the tubers of Orchis latifolia, but the bulk of the ordinary article met with in the country is imported by sea into Bombay from Persia and the Levant.

1228. *Vanda spathulata*, *Spreng.*, H.F.B.I., VI 50.

Vern.:—Ponnampon-maraiva (Malay).

Habitat:—Western Peninsula, from Malabar to Travancore, and Ceylon

Stem about 1ft., leafy, thicker than a swan's quill, rooting upwards; roots very stout, vermiform; internodes 1in., green; leaves 2-4 by 1¼-1½in., loriate, keeled, recurved, flat, tip rounded emarginate or 2-lobed, lower leaves sometimes smaller, ovate, sheath green, speckled with red, peduncle from the middle or lower nodes, 12-18in., erect, robust, with a few distant, short, acute sheaths, green, speckled with red; raceme terminal, 4-5-fid., rhachis stout, bracts broadly ovate, acuminate, pedicel with ovary 1-1½in., flower 1¼-1½in. broad; sepal and petal obovate-oblong, tips rounded, lip longer than the sepal, side-lobes small, oblong, erect, mid-lobe much larger, shortly clawed, triangular-ovate, tip contracted, obtuse, spur very short, conical; column very short, rostellum obscure; anther depressed, truncate, pollinia oblong, strap short, spatulate, gland large, 2-fid; fruit 1½in., obovoid, erect, ribs thick, pedicel 1in., very stout. A striking species, the long erect peduncles, carrying the flowers high above the bushes over which the plant climbs. (Trimen.)

Uses:—It is supposed on the Malabar Coast to temper the bile and abate phrenzy and the golden yellow flowers, reduced to powder, are given in consumption, asthma, and mania. (Ainslie.)

1229. *V. Roxburghii*, *Br.* H.F.B.I., VI. 52.

Sans. :—Rásná, vandáka, nákuli, gandha-nákuli.

Vern. :—Rásná, nái (H. & B.); Dare banki (Santal); Rásná (M. & Guz.); Kanapa chettu badanike, neaidáu, chitteduru (Tel.).

Habitat :—Bengal, Behar and westwards to Guzerat and the Concan, and southwards to Travancore.

Stem epiphytic 2-3ft., climbing. Leaves præmorse, 6-8in. narrow, complicate. Peduncles 6-8in., 6-10-fid. Racemes suberect. Flowers 1½-2in. diam., tesselated with brown Sepals and petals subequal, clawed, obovate waved, yellowish-green or bluish, except from the clathrate brown nerves, margins white. Lip half as long as the sepals, or more. Side-lobes small acute, mid-lobe panduriform violet, tip dilated, truncate 2-lobed.

Uses :—Under the name of *rásna* the roots of this orchid and of *Acampe papillosa*, are indiscriminately used by native physicians. "Rásná root is said to be fragrant, bitter and useful in rheumatism and allied disorders, in which it is prescribed in a variety of forms. It also enters into composition of several medicated oils for external application in rheumatism and diseases of the nervous system." (*Hindu Mat. Med.*) It is also said to be a remedy for secondary syphilis. In Chutia Nagpur, the leaves pounded and made into a paste, are applied to the body during fever, and the juice is introduced into the aural meatus as a remedy for otitis media. (Campbell.)

* We have already stated (Vol ii, p. 260) that we consider it probable that the original *Râsna* of the Arians was *Inula Helenium*, as the two drugs, at the head of this article are notably deficient in the properties ascribed to Rasna by Sanskrit writers; for instance, the plants under consideration cannot be described as Gandha-mûla "having a strong smelling root." Dutt (Mat. Med., p. 258) remarks :—"Under the name of *rásna*, the roots of Vanda Roxburghii and Acampe papillosa are both indiscriminately used by native physicians. They are very similar in the appearance of their roots and leaves, though they differ much in their flowers and fruit. One native physician whom I consulted, pronounced both of these plants to be *râsna*; when, however, I showed him the different flowers and fruit of the two species, he was puzzled." The description of the properties and uses of *râsna* will, we think, convince our readers that the original drug was not what is now used. (Pharmacogr. Ind. III. 392-393.)

1230. *Saccolabium papillosum, Lindl.*, H.F.B.I., VI. 63.

Syn. :—Acampe papillosa, *Lindley.*

Sans. :—Rásná, gandhát, nákuli.

Vern. :—Kánbher, rásná (Mal.).

Habitat :—Bengal and the Lower Himalaya Mts, from Sikkim eastwards, Assam, the Gangetic Delta and the Circars.

Stem 2-3ft, elongate, epiphytic, branched, scandent, as thick as a goose-quill. Leaves 4-5in., obliquely notched. Scape 1-2in., internode, close Flowers $\frac{2}{3}$in diam., bracts semi-circular, mid-lobe of the lip ovate, spur conical, pubescent within. Ovary very short Capsule $1\frac{1}{4}$in., fusiform.

Use :—In Konkan, its roots are considered to have cooling properties. (Dymock) It is said to be a specific for rheumatism. It is invariably given as a substitute for Sarsaparilla.

In the Concan, S. Wightianum, Hook f, Rheede, Hort. Mal. xii, t. 4, and S. præmorsum, Hook. f. Rheede, Hort. Mal. xii., t. 4, very similar plants, are used as Râsna The Marathi peasants call these plants Kânbher (*Pharmacogr. Ind.* III 393.)

N. O. SCITAMINEÆ

1231 *Curcuma angustifolia, Roxb.*, H.F.B.I., IV. 210, Roxb. 10, 11.

Vern —Tikhur (H. and B.); Ararut-chá-gaddá, Tavakhira (Mar.); Kuve-gadde (Kan); Ararut-kishangu; Kua (Tam.); Ararut-gaddalu (Tel)

Habitat :—Tropical Himalaya, from Kumaon to Nepal.

A dwarf herb. Rootstock small, globose; tubers many, oblong, at the end of long fibres Leaves with short petioles 1-1½ft. blade lanceolate, plain green ½-1ft. by 2-3in. Spike with peduncle, æstival, ½-1ft, 3-6 by 2in. diam.; flower bracts 1in. green, ovate; pink; bracts of coma few or many. Corolla tube ½in., lobes of corolla pale-yellow, upper segment ovate, lateral oblong, shorter. Staminode and lip bright yellow, the latter orbicular cuneate, emarginate.

Uses :—The arrowroot from this plant is used medicinally in some parts of the country.

A fairly large trade exists in tikhur or tankir arrowroot all over India. It is used as a substitute for ordinary arrowroot, but regarded as less desirable medically. It is, however, a favourite article of food among the Natives especially for children. The Travancore arrowroot is reported to be not infrequently mixed with the starch of cassava or of tapioca (Manihot utilissima, p. 766) In Upper India it is said starch of the sweet-potato is sometimes employed as an adulterant, and in Bombay the colourless young tubers of the ordinary turmeric are mixed with those of this plant.

The late Dr. Lisboa (Notes on Mahableshwar and other Indian Arrowroot-yielding Pl. in Journ. Bomb. Nat. Hist. Soc , 1887, ii , 140-7) gives much useful information regarding this arrowroot. He would appear to think that much of the East Indian Arrowroot of Western India (especially that of Mahableshwar) is derived from the tubers of Hitchena caulina, Baker. [*Cf.* Cooke, Fl Pres, Bomb., ii., 728.]—Watt's Commercial Products of India, p. 444.

1232. *C. aromatica*, *Salisb.*, H.F.B.I., VI. 210.

Syn. :—C. Zedoari, Roxb 8.

Sans. :—Vana haridra.

Vern. :—Jangli-haldi, ban haldi (H.) ; Banhalud (B.) ; Kapur káchali (Guz.) ; Ránhalad, Kasturi manjal (Tam.) ; Kasturi pasupa, kattu-mannal (Tel) ; Anakúva, kattu-mannar (Mal.) ; Kasturi-arishnia (Kan.).

Habitat :—Throughout India.

An annual herb, biennial, says J. G. Baker ; growing from the previous year's tubers. Rootstock 1in. diam.; tubers sessile, yellow, aromatic inside. Petiole as long as the blade which is 1-2ft. by 4-8in. Leaves 3 to 4ft. caudate, large oblong persistently pubescent beneath, base deltoid, plain green above or variegated with lighter and darker green. Flowers in dense compound ; spikes crowned by a coma of coloured enlarged bracts ; lower bracts ovate, membranous, enclosing several bracteolate fugitive flowers which open in succession. Spike with peduncles 1ft. produced from April to June with or before the leaves, the later half as long, 3-4in. diam ; flower-bracts ovate pale-green, 1½-2in., those of the coma larger and more or less tinged with pink. Flowers shorter than the bracts. Corolla-tube 1in., upper half funnel-shaped. Lobes

pinkish-white, lateral oblong, upper longer ovate concave. Staminode obtuse, as long as the corolla segments. Lip deflexed, orbicular, yellow, obscurely 3-lobed. Stigma obscurely 2-lobed.

Uses:—The rhizomes are used medicinally, being regarded as tonic and carminative. Thwaites says this drug is used by the Singhalese. Dymock states that "the properties of this drug are very similar to those of turmeric, but its flavour being strongly camphoraceous is not so agreeable. It is used medicinally in combination with other drugs as an external application to bruises, sprains, &c. In the Concan, it is applied to promote the eruption in exanthemateous fevers; it is seldom used alone, but is combined with astringents when applied to bruises, and with bitters and aromatics to promote eruptions." Ainslie says the Muhammadans suppose it to be a valuable medicine in certain cases of snake-bites, administered in small doses, and in conjunction with golden-coloured orpiment, *kust* (Costus arabicus) and *ajuan*.

"Used externally in scabies and the eruption of small-pox." (Surg.-Maj. H. D. Cook.) "Rubbed into a paste with benzoin it is a common domestic application to the forehead for headache." (Surg.-Maj. John North.)

1233. *C. Zedoaria*, *Rosc.*, H.I.B.I., VI. 210. Roxb. 7.

Sans.—Karchura, Sati

Vern.—Kachura (H.); Shori; Kachura (B.); Kichchilik-kizhanghu, pulán-kizhanga (Tam.); Kich-chili-gaddala, kachoram (Tel.); Kach-cholam, kach-churi-kizhauna, púlá-kizhauna (Mal.); Kachorá (Kan.).

Habitat:—Eastern Himalaya, wild; cultivated throughout India.

Rootstock large, ovoid, tubers many, some 1in. diam., sessile, cylindric, and many, oblong, terminating into fibres. Leaves 1-2ft., oblong acuminate, narrowed to the base. Petiole longer than the blade. Spikes vernal, ½ft. by 3in. broad. Flowering bracts 1½in., ovate green, often tinged slightly with red; bracts of the coma many, spreading, bright red. Flowers pale-yellow, rather shorter than the bracts. Calyx whitish,

obtusely-toothed, scarcely half as long as the Corolla-tube. Corolla-tube funnel-shaped; lateral segments oblong, upper rather longer, ovate convex Lip ½in. broad, orbicular, deflexed obscurely 3-lobed, emarginate. Capsule ovoid-trigonous, smooth, dehiscing irregularly. Seeds oblong, aril lanceolate, white.

Uses:—The fresh root is considered to be cooling and diuretic, it checks leucorrhœal and gonorrhœal discharges and purifies the blood. The juice of the leaves is given in dropsy (Rheede.) The rhizomes possess aromatic, stimulant and carminative properties. Employed as a stomachic, and also applied to bruises and sprains. The root is chewed to correct a sticky taste in the mouth; it is also an ingredient in some of the strengthening conserves which are taken by women to remove weakness after childbirth. In colds it is given in decoction with long pepper, cinnamon and honey, and the pounded root applied as a paste to the body (Dymock.)

Zedoary contains, according to Bucholz (*Repert. Pharm* xx 376), volatile oil, a bitter soft resin, a bitter extractive matter, gum, starch, &c. The oil is turbid, yellowish-white and viscid, has a camphoraceous taste and smell, and consists of two oils one lighter the other heavier than water. Trommsdorff obtained from the root a substance which he called *Zedoarin*, but did not further describe it. A proximate analysis afforded.

Essential oil, resin, curcumin, &c. .. .	3·79
Resins, sugar	·90
Gum and organic acids	15·22
Starch	17·20
Crude fibre	10·02
Ash	6·06
Moisture .. .	10·81
Albuminoids, Arabins, &c.	35·60
	100·00

Pharmacog. Ind. III. 402-403.)

1234. *C. cæsia*, *Roxb.*, H.F.B.I., VI. 212. Roxb. 9.

Vern.:—Kálo-holud, nil-kantha (B.); Káli-halada (Mar.); Nar-kachúra (Bom.); Nar-kachúr, kalí-haldi (H.); Mánupasupú (Tel.).

Habitat:—Bengal.

Resembles C. Zedoaria, *Rosc.*, but differs widely in the colour of the root. Rootstock ovoid, sessile, large, tubers pale-grey inside. Petiole long, green. Leafy tuft about 3ft. Leaves large, oblong, with a broad purple-brown cloud down the middle, blade 1-1½ft. by 5-6in., glabrous beneath. Spike produced dense 5-6 by 2½-3in. diam.; flower bracts green, ovate, very obtuse, 1½in; bracts of the coma rather longer, many, bright red. Flowers pale-yellow, rather shorter than the bracts. Corolla limb red. Lip ½in. broad obscurely 3-lobed mid-lobe emarginate. (J. G. Baker.)

Uses:—It is considered to have nearly the same medicinal properties as C. Zedoaria The Turkomans employ these roots as a rubefacient, to rub their bodies down with after taking a Turkish bath. (Aitchison.) In Bengal, it is used in the fresh state like turmeric.

1235. *C. amada, Roxb.*, H.F.B.I., VI. 213. Roxb., 12.

Vern.:—Âmâ-haldi (H.); Am-ádá (B.); Ambá-halada (Mar.); Amki-adrak (Dec.); Mamidi-allam (Tel.); Kájura gauri (Bomb.).

Habitat.—Bengal and the Concans native, and widely cultivated under the name of Mango ginger.

An annual. Rootstock large ovoid, sessile tubers thick, cylindric deep or pale-orange when mature, not pale-yellow. Leafy tuft 2-3ft. Petiole as long as the blade which is 1-1½ft. by 6in. or more in breadth, plain green tapering gradually to the base and apex. The form of the leaf is at times oblong-lanceolate as described by some Botanists. Peduncle ½ft. or more hidden by the sheathing base of the leaves. Spike autumnal, 3-6in. by 1½in. diam.; flower bracts about 1in. pale-green; those of the coma-tinged pink. Flowers pale-yellow, about as long as the bracts. Corolla whitish. Lip pale-yellow.

Uses:—The rhizomes are regarded as cooling and useful in prurigo. They are also employed as carminative and stomachic. Locally applied over contusions and sprains. Roots are expectorant and astringent, useful in diarrhœa and gleet.

Chem. Comp.—A proximate analysis of this curcuma afforded—

Essential oil, resin, &c.	4·47
Resins, sugar, &c.	1·21
Gum, organic acids, &c.	10 10
Starch	18·75
Crude fibre	25·20
Ash	7·57
Moisture	9·76
Albuminoids, &c.	22·94
	100 00

(Pharmacogr. Ind. IV. 405).

1236. *C. longa, Linn.* H.F.B.I., VI. 214; Roxb. 11.

Sans. :—Haridrà, nisá.

Vern. :—Haldi (H.), Halud (B.); Haldar, halja (Pb.); Manjal (Tam.); Pasupu (Tel.); Mannal, marinalu (Mal.); Arishina (Kan.); Halede (Mar.); Halada (Guz.).

Habitat :—Widely cultivated throughout India.

An annual. Rootstock large, ovoid; sessile tubers bright-yellow inside, thick, cylindric. Leafy tuft 4-5ft., petiole as long as the plain green blade, which is 1-1½ft. by 4-8in. broad, oblong, narrowed to the base Peduncle ½ft. or more, hidden by the sheathing petioles. Spikes autumnal 4-6in. by 2in. diam. Flower-bracts pale-green, ovate 1½in. Coma-bracts tinged with pink. Flowers pale-yellow, as long as the bracts: like those of C. aromatica, Salis, in structure.

Uses:—Used as a stimulant in native medicine; externally applied in pains and bruises, and internally administered in disorders of the blood. Its use as an external applicant in bruises, leech bites, &c., is perhaps its most frequent medicinal application. The fresh juice is said to be an anthelmintic. A decoction of the rhizomes is applied to relieve catarrh and purulent ophthalmia.

A paste made of the flowers is used in ringworm and other parasitic skin diseases. Dymock says the Muhammadans use turmeric medicinally in the same manner as the Hindus; they also prescribe it in affections of the liver and jaundice on account

of its yellow colour. The editor of the *Pharmacopœia of India* speaks favourably of the use of a decoction of turmeric in purulent conjunctivitis; he says it is very effectual in relieving the pain. In coryza he states that the fumes of burning turmeric directed into the nostrils cause a copious mucous discharge, and relieve the congestion. Murray remarks that it is given by the native doctors in the diarrhœas which are so troublesome and difficult to subdue in atonic subjects. Baden-Powell remarks that it is employed in " intermittent fevers and dropsy. It contains much essential oil and starch and acts as a stimulant and aromatic tonic.

The root, parched, and powdered, is given in bronchitis in doses of grs. xxx to xl (Civil Surgeon J. Anderson, M. B, Bijnor.) The smoke produced by sprinkling powdered *haldi* over burnt charcoal will relieve scorpion sting when the part affected is exposed to the smoke for a few minutes. A paste made of fresh rhizome is applied on the head in cases of vertigo. Fresh juice is cooling. Fumes of burning root is employed during hysteric fits. (T. N. Ghose.) Turmeric and alum in the proportion of 1 to 20, is blown into the ear in chronic otorrhœa. (Dr. Darasha H. Baria)

Turmeric contains about 1 per cent. of an essential oil. *Curcumin*, the yellow-colouring matter of turmeric, has been examined by several chemists, whose experiments have led to the conclusion that its formula is either $C_{10}H_{10}O_3$ or $C_{10}H_{16}O_4$, that it melts at 172°, forms red-brown salts with alkalies, is converted by boric or sulphuric acid into *rosocyanine*, by reduction with zinc-dust into an oily body, by oxidation into oxalic or terephthalic acid, and by fusion with potash into protocatechuic acid. (Pharmacogr Ind. III. 412)

1237. *Kæmpferia galanga, Linn.* H.F.B.I., VI. 219 Roxb. 5.

Sans. :—Chandra malika.

Vern. :—Chandra múla (H. and M.); Chandú múlá, humalá (B.); Katsjulam (Mal.); Katsjolan (Tam.); Kachoram (Tel.).

Habitat :—In the plains throughout India; much cultivated for its highly fragrant root of great commercial value sold in the bazaars as Kachari in Bombay. (K. R. K.,

An artomaic annual herb. Rootstock tuberous. Root-fibres

cylindric. Leaves sub-orbicular, sub-sessile 3-6in. long, aromatic, spreading flat on the ground, tip deltoid, thin, deep green, 10-12-ribbed, margin not thickened nor coloured. Petiole short, channelled. Flower 6-12in. fugitive, sweet-scented, opening successively; bracts lanceolate, green, small. Calyx as long as the bract. Corolla-tube 1in.; segments lanceolate, ½in. Staminodes half an inch long and broad, obovate—cuneate white; lip white with a lilac throat deeply bifid below in middle, 1in. broad, lobes obtuse. Anther-crests, small, quadrate, with 2 shallow obtuse lobes. Fruit not seen by me among the Bombay grown species. (K. R K)

Uses:—It is probable that the tubers of this species as well as of *K. rotunda* are used indiscriminately in Hindu medicine. They are fragrant and of a warm, bitterish, aromatic taste (Ph. Ind.) Used by the Hindu ladies as a perfume for the hair The tubers reduced to powder and mixed with honey are given in coughs and pectoral affections. Boiled in oil it is externally applied to stoppages of the nasal organs (Rheede.)

Chem. comp.—The fatty matty matters dissolved out of this tuber by either consisted of a fragrant liquid oil, and a solid white crystalline substance separated by petroleum ether The alcoholic extract, amounting to 2·76 per cent, contained some white transparent prisms of an alkaline nitrate, and a few nodules of a circular-shaped crystals of a yellowish colour This extract contained a small quantity of alkaloid, and some sweet body reducing Fehling's solution. A large quantity of starch is present, and 4 14 per cent of gum. The tubers dried at 100°C lost 4 11 per cent of moisture, and yielded 13·73 per cent. of mineral matter. (Pharmacogr. Ind., III. 416.)

1238 *K angustifolia*, *Rosc.*, H.F.B.I., VI. 219. Roxb. 6.

Vern.—Kanjan-búra, madú-nirbisha (H & B.)

Habitat—Foot of the Eastern Himalayas; also in Bengal.

Rootstock tuberous; root fibres slender or cylindric. Leaves ascending, lanceolate, many, 6-8in. by 1in. or less sessile Flowers few, in a central sessile spike; bracts small. Calyx 1in Corolla-tube white, twice as long as the calyx; segments 1in., linear, very narrow, white, reflexing. Staminodes erect, oblong, white, ¼-¾in Lip reflexed, ½ by ¾in., lilac, deeply cut into

2 sub-orbiant, obovate lobes, about half way down; anther-crest quadrate, shallowly bifid.

Use:—The people of Bengal use the roots as a medicine for their cattle. (Roxburgh.)

1239. *K. rotunda, Linn.*, H.F.B.I., VI. 222. Roxb. 6.

Sans.:—Bhûmichampaka.

Vern.:—Bhuichampa (H & B); Bhuichampo (Guz.); Konda kalava (Tel), Malan-kua (Mal.).

Habitat:—Throughout India.

An annual, rootstock tuberous, outside yellowish-brown, inside yellowish-white; rootlets white, numerous, 2 or 3in. long, bearing fascicles of numerous, oblong bulbs, 1-2in. long Bulbs glabrous, mucilaginous inside. Leaves radical, oblong, erect, petioled, 1ft by 4-6in, rich, purple beneath, green above. Petiole sheathing. Spikes 4-6-fid, produced in March and April before the leaves. Flowers erect, scapose, 4-6 to the scape, fragrant, large, of various colours, white, pink, yellow and purple, harmoniously blended in one and the same flower. Bracts oblong, acute, outer short, inner 2-3in. long Calyx nearly as long as the corolla-tube, white, membranous, somewhat gibbous; apex generally two-toothed and of a dotted purplish colour Corolla tube 2-3in., segments spreading, long, linear, nearly as long as tube Staminodes $1\frac{1}{2}$-2in, oblong, erect, white. Lip rather shorter, reflexed, 2-fid, to below the middle lobes $\frac{3}{4}$-1in. broad, deeply tinged with lilac or red-purple, cut into two sub-orbicular lobes. Anther-crest deeply bifid, cut half way down into two lanceolate lobes, with often a small tooth between. (J. G. Baker.)

Uses:—According to Sanskrit writers the root, used in the form of a poultice, promotes suppuration. (U. C. Dutt.) Rheede informs us (*Hort. Mal.*, II., 18) that the whole plant, when reduced to powder and used in the form of an ointment, has wonderful efficacy in healing fresh wounds, and that, taken internally, it removes any coagulated blood or purulent matter that may be within the body; he adds that "the root is a useful medicine in anasarcous swellings." Dr.