in length, rounded on the back, thin, membranous, veined, pale-green, becoming white as the grain ripens ; pales 2, shorter than the glumes, lower one faintly nerved, lanceolate, bifid, rounded on the back, smooth, afterwards hard and firm, pale-green, awned ; awn proceeding from the back of the pale and 1½ times as long, rough and twisted ; upper pale rather shorter than the lower, thin, transparent, 2-toothed ; margins inflexed. Within the pales are two small ciliate scales (lodicules). Stamens 3, exserted ; anthers yellow. Styles 2, short feathery, white. Fruit (the grain) closely covered by, but not adherent to, the hard persistent pales, $\frac{1}{3}$in. in length, narrowly oval-oblong, hairy, and with a deep furrow on the inside. (Duthie.)

Uses :—It is believed to produce poisonous and deleterious effects. (Stewart).

Regarding its use in the treatment of Diabetes, see my brochure "Diabetes and its Dietetic Treatment" (8th Edition, 1917). B. D. B.

1343. *Cynodon dactylon*, *Pers.*, H.F.B.I. VII. 288 ; Roxb. 289.

Syn :—Panicum dactylon, *Linn.*

Sans. :—Durva.

Vern. :—Duba, kâli ghâs, râm ghâs, nil dub, dhupsa, hariali, (H.); Dûb, daurva, dubra, kabbar, talla, (Pb.); Burawa (Trans-Indus); Chibhar (Sind); Dub, dûrbâ, (B.); Dobi-ghâs (Santal) ; Durva, karala, haryeli (Mar.) ; Arugam-pilla, hariali (Tam.) ; Ghericha, haryali (Tel.).

Habitat :—Throughout India.

Stem slender, prostrate, widely creeping, forming matted tufts, with slender erect or ascending flowering branches 3-12 in. high. Leaves $\frac{3}{4}$-4 by $\frac{1}{20}$-$\frac{1}{8}$ in., narrowly linear or lanceolate, finely acute to pungent, more or less glaucous, soft, smooth, usually conspicuously distichous in the barren shoots, and at the base of the stems ; sheaths tight, glabrous or hairy, sometimes bearded at the mouth ; ligule a very fine ciliate rim.

are membranaceous wings along the sides of the decurrent bases of the segments. Segments lanceolate or ovate-lanceolate, parallel-veined, pale green, entirely glabrous; margins entire. Scape solitary, 2-4in. long, cylindric, greenish, mottled with white spots, very thickly verrucose, invested below with 2 or 3 imbricated scales or bracts, linear-lanceolate, tough, fleshy, rose-coloured, mottled with green or purple spots. Spathe large, leathery, marescent,* large ovate, 1-1½ft. long, very broad, erect; below, of fleshy substance, infundibuliform, convolute; above membranous, broadly campanulate, patulous, with undulate curled margins. The convoluted part, in its greatest circumference, is about 1½ft.; externally, speckled with bright green dots and pale yellowish-greenish dots; internally, purple at base, with very thick fleshy warts thickest and deepest-coloured near the scape, paler and less dense as they approach the mid-part of the infundibular portion; the mid-part is conspicuously greenish-yellowish, without any warts. Spadix projecting distinctly beyond the spathe, erect, thick, club-shaped, almost half-way from below cylindrical and pistil-bearing, thence upward it is pear-shaped and thick, bearing anthers; above this part lies the apical appendage or club, expanding into a globosely conoid, irregularly formed mass when young, which becomes fungating and sinuously lobed as it matures. The texture internally is spongy, fibrous, lacunose, externally corrugated, brownish-purple, resembling soft leather, with minute warts or projections alternating in regular order with shallow depressions between. As the conoidal apex matures into the more corrugated mass of sinuous small lobules, they emit an intolerable offensive odour of putrid flesh, inviting hordes of blue-bottles and other large flies which cover the whole mass with their eggs; and the subsequent maggots which thickly beset it for next four or five days, render the flowerstalk as disgusting to the eye and nose as carrion. Flowers unisexual, the males on the middle third of the spadix immediately below the appendage; the females on the lower

* That is, not actually falling off before the spadix is perfected, but withering long before that time.

third or basal part of the spadix. Perianth absent, male and female flowers contiguous, *i. e.*, having no neuters between. Male-Stamens numerous, dense. Anthers 2-celled, sessile, close-packed, compressedly cylindrical; rounded at the top; straw-coloured; glabrous. Connective, longitudinal, fleshy, separating the two loculi Pollen globose, lemon-yellow, or almost orange-coloured, "vermiform," says Trimen. Female flowers:—pistils numerous; somewhat loosely and spirally arranged; stigma 3-lobed, often 2-lobed, all on the same level; much thickened and expanded, slightly papillose, cream-coloured or yellowish. Style crimson or purplish, $\frac{1}{4}$-$\frac{1}{3}$in. long, much longer than ovary, deciduous. Ovary, 2-rarely 3-celled, with only 1 ovule; purple or deep crimson; broad, globose. Ovules attached to the inner angle of the carpel at its base, ascending, ovoid, anatropous. "Berries 2-3-seeded, red," says Trimen But not known ever to have developed in the Westtern Peninsula and the Dekkan, where it is much cultivated for its tubers. (K. R. K.)

It must be noted here that the wild or uncultivated variety of Amorphophallus campanulatus is entirely different from the tuber of Amorphophallus sylvaticus* (Kunth), which is also locally named Jangly Suran, and described by Dr. Dymock under that name in the Pharmaceutical Journal (p. 172, vol, vii, 3rd Series). Dr. Dymock was well aware of this fact at the time he first described this plant, for he has since repeated his remarks in his later works,—viz., "The Vegetable Materia Medica of Western India' and 'The Pharmacographia Indica"—that "it is probable the two plants are distinct" for he adds that "it is probable the roots of the wild Amorphpallus campanulatus form a part of the commercial article known as Madanmast, which is the tuberous root of Amorphophallus sylvaticus, peeled, cut into slices and strung upon a string" (K. R. K.)

Uses:—The corm (or tuber) and the seeds are used as irritants and relieve the pain of rheumatic swellings when applied externally. It is considered a hot carminative in the form of a pickle. The tubers contain a large quantity of farinaceous matter, mixed with acrid poisonous juice, which may be extracted by washing or heat. When fresh, it acts as an acrid stimulant and expectorant, and is used in acute rheumatism.

*Synonyms.—(I) Synantherias sylvatica (Schott.)—Hooker's Flora Br. Ind., art XIX, page 517: (II) Arum silvaticum (Warden and Pedler's article on he nature of the toxic principle of the Aroideæ.—Journal As. Soc, Bengal, vol. LVII, part 2, No. 1.)

The tubers contain an acrid juice which should be got rid of by through boiling and washing, otherwise the vegetable is apt to cause troublesome irritation in the mouth and fauces. Medicinally it is considered serviceable in hæmorrhoids; in fact, one of its Sanskrit synonyms is *arshghna*, or the curer of piles. It is administered in this disease in a variety of forms. The tuber is covered with a layer of earth and roasted in a fire; the raosted vegetable is given with the addition of oil and salt. (U. C. Dutt.)

It has a mucilaginous taste and is faintly bitter,* and acrid; it is supposed to have restorative powers and is in much request. (Dymock).

The root used in boils and ophthalmia; also as emmenagoue (Lindley).

Dr. Nasarvanji Fakirji Surveyor, M.D., B.S.C., M.A., M.R.C.P., a distinguished Graduate of the Bombay University, writes: "The wild variety (under microscope) shows two forms of crystals, while the cultivated variety shows only one form. I shall first describe those crystals which are found in both the varieties and then those found in the wild variety only. Those found in the former I shall call the white crystals; while those found in the latter or wild variety only will be described as brown crystals. The white crystals are about 120μ† in length and 3μ in thickness. They are acicular and glistening and have a double contour. They are sharp-pointed at either extremity and always straight. They appear to be rigid; more numerous in the older parts, while they are almost absent from the youngest part (e.g., leaf-bud). They are insoluble in cold water; slightly soluble in boiling water. Acetic acid dissolves them with evolution of gas (C_2 probably).

"On incinerating a thin film of the juice on a slide, these crystals were found to be fractured in numerous places, while many appeared to be either transversely striated or granular. This was due perhaps to the fact that the water of crystallization was driven out by the heat. These crystals were found to be scattered about, not collected in definite bundles. They were probably carbonate of calcium.

"The brown variety was only found, as has been already remarked, in the wild Amorphophallus. These crystals were very fine; about one-third the size of the first. They were also acicular, but did not show a double contour. They were found in the cells arranged in sheaves, and were distinctly brown when viewed in a mass. On adding a drop of water to the juice of the tuber, these cells swelled up and discharged the crystals. When examined singly, the

* It is not at all bitter. It is the tuber of Sauromatum guttatam, *Schott*, which is bitter, and therefore known in the Thana District as Bitter suran.—K.R.K.

† $\mu = \frac{1}{1000}$ of a Millimetre.

crystals appeared to be very thin and somewhat curved. The brown tinge was still noticeable The length of each crystal is 50 μ, and thickness under $\frac{1}{4}\mu$. The crystals are sparingly soluble in warm water, freely in boiling water, so that a piece of the wild variety, on being reduced to pulp and boiled with distilled water, was almost deprived of the crystals, while the white crystals were still seen. By filtering the hot water, brown crystals were obtained from the filtrate by evaporation. Is it a fact that the wild variety can be eaten, if well boiled, especially with salt ?

"On incinerating the piece just as described above, I found that these crystals were not altered in the slightest manner, thus proving that they too were inorganic in nature and that they were not oxalates.

"Acetic acid dissolved them without evolution of gas. These were probably sulphate of calcium crystals; however, I am not certain of that. I examined pieces of both the varieties for other salts after charring and incinerating them This method showed insoluble and soluble carbonates, soluble sulphates and traces of chlorides.

"Of course, sulphate of calcium, being a poisonous salt, must have something to do with the properties of the wild variety; however, it is perhaps not the only cause; a glucoside or an alkaloid may be present too As I have neither the means nor the time at my disposal, I am not able to settle that point.

"The important facts however, are that the brown crystals are only present, as far as I know, in the wild variety, and that they are soluble in boiling water and weak acids, without evolving any gas like the white crystals. These are very delicate, and appear in places to be slightly bent; while the white crystals are rigid, straight, and thicker."

1314. *Synantherias sylvatica, Schott*, II F.B.I. VI. 518.

Syn :—Arum sylvaticum, *Roxb.* 630

Sans :—Vajra-kanda.

Vern. :—Uzomut (Goa); Wajramuta (Mar).

Habitat :—The Deccan peninsula, from the Northern Sircars, the Concan and southwards to Ceylon

Tuberous herbs. Tuber 1-2½in diam, subglobose bulbiferous. Leaves long petioled, a foot broad or less, divisions 1-2-pinnatifid; leaflets few, ovate-lanceolate or oblanceolate, acuminate or caudate, 5-6in. long, lower on the divisions smaller; petiole 6-18in., pale-green, streaked with darker green; peduncle up to 8in. long, pink, clouded with dirty green, basal sheaths, short, scarious, pale-pink (Trimen). Hooker says "petiole and peduncle 1-2ft." Spathe 1-3in. long, pale-pink,

spotted with green, purple within towards the base. Spadix up to 10in. long, erect, appendage up to 7in., by ¾in. diam.; but often more slender, sometimes tapering from the middle to base and apex, purple, smooth. Male flowers of scattered or fascicled minute sessile obcuneate anthers (J. D. H.) Anthers in groups of 4-6, purple or pink; ovary globose, green, stigma yellow; style very short, neuters as large as the groups of stamens or larger oval or oblong, disciform, pale, shining. Male and female inflorescence distant, with the oblong depressed interposed neuters.

Uses:—The country people use the crushed seed to cure toothache. A small quantity is placed in the hollow tooth and covered with cotton; it rapidly benumbs the nerve; they also use it as an external application to bruises on account of its benumbing effect. In the Concan, the seeds rubbed into a paste with water are applied repeatedly to remove glandular enlargements. The taste of the fruit is intensely acrid; after a few seconds it causes a most painful burning of the tongue and lips, which lasts, for a long time, causing much salivation and subsequent numbness. (Dymock.)

1315. *Plesmomum margaritiferum*, *Schott*, H.F.B.I., VI. 518

Syn.:—Arum margaritiferum, *Roxb.* 630.

Vern.:—The Goa name of the plant is Azomut or Uzomut. (Dymock).

Habitat:—Bengal (Roxb.); Serampore (Bentham); Dacca (Clarke); Asnora in the Goa territory (Dymock); Hindustan.

Tuberous herbs. Tuber 6in. or less, bulbiferous all over. Leaves 1½ft. diam., 3-sect, segments pinnatisect, lateral forked; leaflets few, 4-6in., linear, acuminate. Petiole 1½-2ft. green. Peduncle 12-18in., stout, pale-green, streaked with darker green. Spathe 5-6in. by 4in. broad, erect, broadly ovate, obtuse, concave, loosely convolute; below the middle, pale yellow-green, flushed with pink within, dark-purple at base. Spadix very stout, stipitate, obtuse, as long as the spathe; male inflorescence much the longest; neuters as large as peas, white,

interposed between the distant male and female inflorescence respectively; no appendage. Anthers crowded, very short, pores confluent. Ovaries scattered, globose, narrowed into a short style. Stigma large, 2-3 lobed. (J. D. Hooker).

Uses:—"The country people in Goa use the crushed seed to cure toothache; a small quantity is placed in the hollow tooth and covered with cotton; it rapidly benumbs the nerve; they also use it as an external application to bruises on account of its benumbing effect." (Dymock).

1316. *Remusatia vivipara, Schott.* H.F.B.I., VI. 521.

Syn.:—Arum viviparum, *Roxb.* 625

Vern.:—Maravara Isjembu (Mal.); Rukh-alu (Mar.).

Habitat:—Subtropical Himalaya The Khasia Hills. Behar, on Parasnath. The Western Ghats.

Tubers 1-1½in. in diam., clustered, depressed, rooting from the crown; bulbilliferous shoots 6-12in. long, as thick as a goose quill, simple or shortly branched, ascending, flexuous, bearing at the nodes clusters of oblong, squarrosely scaly bulbils $\frac{1}{10}$-$\frac{1}{4}$in. long. Leaves peltate, 5 by 3½ to 18 by 12in., membranous, orbicular-ovate or cordate, acute or acuminate, with strong main nerves and fine venation between them; petiole 6-12in. long, with a short sheath Spathe 4 5in. long, coriaceous; tube 1-2in. long, oblong or oviod, green; limb 2-3in. long, broadly orbicular-ovate or ovate-cordate, 2-3in. broad, golden-yellow. Spadix 1-1½in. long; the male inflorescence ½in. long. The plant rarely flowers, but sends up long bulbilliferous shoots from the crown of the tuber.

Uses:—The root is made into an ointment with turmeric and used as a remedy for itch; and the juice with cow's urine is considered to be alexipharmic (Rheede.)

1317. *Aolocasia Antiquorum, Schott,* H.F.B.I., VI. 523.

Syn.:—Arum Colocasia, *Willd.* Roxb. 624.

***Sans.*:—Kachchî, katchû, kachwî, kachwæ.**

Vern. :—Kachu, arvi, ghuiyân, cham-kure-ka-gaddah (Hind.); Kochu, ashu-kochu, bun-kochu, guri. (Beng.); Dzu (cultivated) and kirth (wild), (Angami Naga); Rab alu, kachalu, gandiali, arbi, kasauri gagli, ghuyan (Pb.); Alu, Kasalu (Mar); Saru (Uriya); Shimak-kizhangu, shima-ikilangu (Tam.); chama-kura, châma gadda, chama-dumpa, chema (Tel); Chempa-kizhanna, kaladi (Mal); âvî-gadde, keshavanga-gadde, (Kan.).

Habitat :—Throughout the hotter parts of India, wild as well as cultivated. Ceylon.

A tall, coarse herb. Root-stock tuberous, about 6in. in diameter, short or elongating underground for several feet, giving off long sheathed bulbilliferous runners from the base. Leaves 6-16in., dark green, sometimes clouded with black, bifid half way from the base to the insertion of the petiole, basal lobes rounded, mid-rib beneath very stout, penniveined, with 5-7 veins radiating from the top of the petiole, which is 3-4ft. long, green or violet, sheath narrow Spathes solitary or fascicled, stoutly peduncled, 8-12in. long, erect, narrow, green, tube 2-3in., narrowly ellipsoid, limb erect, lanceolate, acuminate, convolute, caudate, acuminate. (J. D. Hooker). Spadix about half as long as the spathe, slender, appendage 1-3in, cylindric or subulate; male and female inflorescence each about 1½in. long, separated by an interval covered with flat oblong neuters. (Trimen) Every part edible.

Uses :—The pressed juice of the petioles is styptic, and may be used to arrest arterial hœmorrhage. Dr. Bholanath Bose reports very highly in favour of this property, and states that the wound heals by first intention after its application. (*Pharm. Ind.*) It is sometimes used in earache and otorrhœa, and also as an external stimulant and rubefacient. "The juice expressed from the leaf stalks is used with salt as an absorbent in cases of inflamed glands and buboes. The juice of the corm of this species is used in cases of alopæcia. Internally, it acts as a laxative, and is used in cases of piles and congestion of the portal system, also as an antidote to the stings of wasps and other insects." (Dr. Thornton in Watt's Dic.).

A microscopic examination of a section of a tuber revealed the presence

of very numerous bundles of needle-shaped crystals, and we also found similar crystals in the leaves and stems. These crystals were seen under the microscope to be insoluble in cold acetic acid, but easily soluble in cold diluted nitric or hydrochloric acid." "There appears to us to be no reason to doubt the fact, that the whole of the physiological symptoms caused by Arums are due to these needle-shaped crystals of oxalate of lime, and that the symptoms are thus due to purely mechanical causes. Bearing in mind the action of re-agents on calcic oxalate, the reason why mere boiling in water failed to deprive them of their activity is explained by the insolubility of oxalate of lime in water. Again, the action of dilute acetic acid, even at temperatures of 100° C., in slightly lessening the activity of the tubers, is due to the very slight solubility of oxalate of lime in that acid And, lastly, the complete loss of all physiological action when the tubers were treated with dilute nitric or hydrochloric acid is evidently due to the ready solubility of calcic oxalate in those mineral acids. And these assumptions, as we have already indicated, were fully demonstrated by the microscopic examination of sections of the tubers treated with the reagents we have mentioned One point, however, remains to be explained: we observed that, on drying, the tubers lost practically the whole of their physiological activity. Clearly there could have been no loss of oxalate of lime on desiccation, and, as a matter of fact, we found as many crystals on microscopic examination of dried Arums as we had found in the fresh tubers. We explain this apparent anomaly in the following simple manner. In the fresh condition of the tubers, the bundles of crystals of oxalate of lime are cone-shaped, more or less, the sharp points covering a wide area, and forming the base, but, in the drying of the tubers, the needles appear to arrange themselves more or less parallel to one another, and the sharp points thus cover a smaller area. And thus, instead of each crystal acting as a separate source of irritation and penetrating the tissues, the bundles act as a whole." (Warden and Pedler)

1318 *Alocasia Indica*, *Schott.*, H.I B.I., VI. 525.

Syn. :—Arum indicum, *Roxb.* 625

Sans. :—Mânaka.

Vern. :—Mânakanda (H); Mânkochu (B and Ass.); Alû (Mar.).

Habitat :—Generally cultivated around the huts of the poorer classes in Bengal.

Tuberous tall coarse herb. Stems attaining 8ft stout, 3 8in. diam., emitting bulbiferous suckers. Leaves 2-3ft. large, ovate deeply and sagittately cordate repand, lobes rounded very shortly connate, sinus narrow, nerves about 8 pair, petiole stout transversely clouded. Peduncles (always in pairs, *Roxb.*) shorter than the petioles. Spathe 8-12in., pale-yellow, green; tube

many times shorter than the very long linear oblong subtruncate cuspidate limb. Spadix equalling the spathe. (J. D. Hoooker.) Appendage longer than the inflorescence. Ovary 1-celled, stigma sessile 3-4 cleft.

Uses :—Medicinally it is said to be useful in anasarca. The flour obtained by pounding the dried stems boiled with rice flour until all the water has evaporated, is given to the patient and no other food allowed.

"As a food taken frequently, it seems to act as a mild laxative and diuretic. In piles and habitual constipation it is useful." (Surg. D. Basu, Faridpur.) "The flour of old dried stems is a valuable article of food for invalids. It is an excellent substitute for arrowroot and sago in place of which I have used it in many instances." (Asst. Surg. Shib Ch. Bhutt, Chanda). "The ash of the root-stocks mixed with honey is used in cases of aphthae" (Asst. Surg Anund Ch. Mukerji, Noakhally.) —Watt's dictionary.

In an interesting paper on the "Use of Manmanda in Indian Therapeutics and its probable explanation," Dr. Lal Mohan Ghoshal writes in *Foods and Drugs* for April 1913, as follows :—

Composition and preparation of Manmanda.—The kochu of at least one year's standing is taken, dried and pulverised into fine powder; this is then prepared with rice into pasty mass by boiling; this paste is sufficiently macerated and filtered through fine muslin The filtrate is then allowed to be taken as food. The composition of such a manda is the following :—

Protein– 1·78 p. c. (increase in protein is due to to the addition of rice); Carbo-hydrate– 20·21 p. c.; Moisture—77·27 p. c; Fat—a trace only.

The filtrate is a syrupy paste, slightly acrid or unpleasant in taste; reaction for calcium oxalates can be obtained by filtering the paste through a filter paper and evaporating the watery portion.

This is all about the composition of man-kochu and the preparation of manmanda.

The question now arises, what is there in the manmanda that leads the kabirajas to use the manmanda so indiscriminately in all sorts of œdema and dropsy. Generally from 4oz to a pint of the manda is given according to the strength of the patient; if the patient is strong and the œdema is of recent origin the treatment is mainly directed to the starvation of the patient, strict regulation of water (sometimes it is altogether cut off) and administration of about 8oz of the manda; if the patient is weak and has got a good deal of thirst associated with fever, manmanda about a pint is

allowed with stimulating drinks made of infusions of various drugs (pânchan), and a little hot water is allowed to be sipped at definite intervals. Salts are entirely cut off.

From what is stated above we see that about 4 to 10 grams of protein and 50 to 120 grams of carbo-hydrates are allowed by the administration of manmanda according to the strength of the patient; but in these we see nothing that tends particularly towards the relief of œdema, although we see that considerable improvement is done by this treatment. It must be, then, that manmanda is administered not particularly for its nourishing property, but for something else. It may be possible that it is administered for the calcium oxalate that is present in the manmanda. This oxalate has probably the property of relieving the œdema caused by the retention of salts. It is now generally accepted that the œdema is mainly due to the retention of salts, particularly sodium chloride; and the oxalate has probably the property of removing this retention and thereby relieving the consequent œdema. The following experiments were done to show that the calcium oxalate has such property when administered both in normal individual and in œdematous persons:—

PART II EXPERIMENTAL.

Laboratory Experiments. A solution of sodium chloride is precipitated by a solution of oxalates; the precipitation is more marked by the addition of a solution of calcium oxalate

Experiments on healthy individuals.—Two persons were selected and their urines were examined under normal conditions, and under different conditions after the administration of calcium oxalates. * * * *

From the above experiments we see that by the administration of calcium oxalate, the chloride excretion is positively increased, the quantity of urine as well as the urea excretion is also increased; with 5 grams the quantity of urine is rather comparatively decreased, but the increase in chloride and urea excretion is maintained. The increase of cholorides is positively more than what is ingested. Even with a diet having no chlorides, the urine showed an excretion of 2 grams of the chloride. Watery part in this latter case is considerably diminished, probably owing to less consumption of water which is necessary only to maintain the osmotic equilibrium when salts are ingested with the diet. Urea excretion is also less, for the reason that it is difficult to take proper amount of food without salt and nitrogenous metabolism is consequently rather low.

Thus we see that with the administration of calcium oxalate the chlorides and urea, particularly the former, are definitely increased.

1319. *Homalomena aromatica*, *Schott.*, H.F.B.I., VI. 532.

Syn. :—Calla aromatica, *Roxb.* 630.

Vern. :—Kuschu gundubi (B.).

Habitat :—Assam ; Chittagong.

Herbs. Leaves 6-12in. broad, cordate or sagittately cordate, acuminate, basal lobes divaricate. Spathe green, obtuse 2-4in. long, not contracted above the female inflorescence. Spadix included male and female inflorescence close together, cylindric. Stamens distinct in dense groups. Seeds small, ovoid, albuminous. Embryo axile.

Uses :—The large rhizome, which is invested with the old withered leaf-scales, bears numerous white long rootlets issuing from its surface, and is said to be held in high estimation by the natives as an aromatic stimulant. (Watt.)

1320. *Scindapsus officinalis, Schott.*, H.F.B.I., VI. 541.

Syn. :—Pothos officinalis, *Roxb.* 145.

Sans. :—Gaja-pippali, kari-pippali, kapi-balli, kola-balli, śreyasi, vaśira.

Vern. :—Gajapipal, Hati-pipli, barîpiplî (H.) Gajapipal, (B.); Dare jhapak (Santal); Thora-pimpli (Mar.); Motto-pipar (Guz.); Atti-tippili (Tam.); Enuga-pippalu, gaja-pippallu (Tel.); Doddahipalli (Kan.); Attitippili, anait-tippili (Mal.).

Habitat :—Sal forest of the Siwalik, trailing on trees by suckers from nodes very common in the Dudhli Block. Tropical Himalaya, from Sikkim eastward. Bengal, Chittagong, Burma and the Andamans.

A forest plant, fleshy, climbing shrub, herbaceous, perennial. Stem reaching 1in. or more in diam.; annulate. Leaves 5-12 by 2½-6in., dark-green, ovate or elliptic-ovate, alternate, caudate-acuminate; base rather obliquely rounded or subcordate; petiole 2-6in. long, elbowed at tip, sheathing amplexicaul. Spathe yellow within. Berries fleshy, ovoid or lanceolate, about 6in. long. (Kanjilal.) Seed ovate-cordate.

Fruiting spadix sometimes a span long. (J. D. Hooker.) The stem is traversed by a strong fibre which is easily separated and can be used for various purposes. Leaves eaten as a vegetable. (Kanjilal.)

Uses :—The dried fruit is a stimulant, diaphoretic and anthelmintic (*Ph. Ind.*) By Sanskrit writers it is said to be aro-

matic and carminative, and useful in diarrhœa, asthma and other affections caused by deranged phlegm. (U. C. Dutt.)

Among the Santals the fruit is applied externally for rheumatism. (Revd. H. Campbell.)

1321. *Rhaphidophora pertusa*, *Schott.*, H.F.B.I., VI. 546.

Syn. :—S. Pertusus, Schott. Pothos pertusus, *Roxb* 145.

Vern. :—Ganeskanda (Mar.).

Habitat :—The Dekkan Peninsula; Coromandal, Malabar; Ceylon rather rare.

A tall perennial climbing shrub rooting on trees. Stem cylindric 1½in. diam., green, smooth, leafy for the greater part of its length. Leaves 8-18in. long, and 6-10in. broad; young small, ovate, entire; old pinnatifid to below the middle or perforate, base truncate or subcordate, lobes few, broad, falcate, acuminate, primary nerves 5-8 pairs connected by anastomosing veinlets. Petiole about as long as the blade deeply channelled, young winged, wings not auricled at top, basal sheaths 4-5, oblong, obtuse, brown. Spathe shortly stoutly peduncled, yellow, 5-7in. ovate-oblong or cylindric, cymbiform, acuminate, or cuspidate. Spadix sessile, shorter than the spathe, very stout, cylindric, ¾in. diam., top rounded. Flowers hexagonal. Stamens 8; filaments very stout, sometimes bifid; anthers small. Ovary 6-gonous. Stigma linear, raised on a short stout style. (Trimen.) The ovary is 4-angled, stigma sessile, pulvinate, says J. D. Hooker.

A closely allied plant, says Trimen, cultivated in gardens always, has perforated leaves.

Uses :—The juice of the plant with black pepper is given to people who are bitten by *Kusreyia ghannas* (*Daboia russellii*, a viper), a snake so called because the part bitten by it mortifies. The juice, with that of the roots of Croton oblongifolium, and of the fruit of Momordica charantia is also applied to the bitten part. (Dymock.)

1322. *Lasia heterophylla, Schott.*, H.F.B.I., VI. 550. *Roxb.* 147.

Vern. :—Kanta-kochû (B.) ; Kanta saru (Santali) ; Mulasari, kanta-kachoramu (Tel.).

Habitat.—Found from Tropical Sikkim Himalaya, Assam, Bengal, Burma Singapore Rather common in low moist country in Ceylon. Not in Peninsular India, (K. R. K.).

Root-stock creeping, 1in. diam. Leaves 6-18in. long, rigidly coriaceous, young hastate or sagittate, old pinnatifid, segments lanceolate, acuminate, smooth above, beneath costate, and strongly penniveined, mid-rib and veins naked or spinous beneath. Petiole 2-4ft, terete, base sheathing. Spathe 8-14in., spirally twisted above the spadix, about as thick as the little finger, acute, green or yellowish, margins very dark-purple except at the base, open at base only when the pollen is being discharged, closing afterwards. Spadix about 1in., claret coloured, fruiting 4-5in, and 1in. diam. Flowers sessile, perianth-segments 4-5, concave, dorsally hooded, dull pink; filaments very broad, anther-cells oblong, divaricate below; ovary short, columnar, green, stigma large, sessile, pulvinate, pink. Fruit an oblong or capitate syncarp 2in. diam., of muricate berries, ½in. diam. Root-stock eaten in famine times. (Trimen.)

Uses :—The root is highly esteemed by the Santals as a remedy for affections of the throat. (Campbell.)

The leaves and roots are also used medicinally by the Singhalese.

1323. *Acorus calamus, Linn.* H.F.B.I., VI. 555. *Roxb.* 296.

Sans. :—Vâchâ (talking), shadgrantha (six-knotted), ugragandha (strong-smelling), jatila (having entangled hair).

Vern. :—Bach, gor bach (H.) ; Bach (B.) ; Gandilovaj, goda vaj (Guz.) ; Vekhand (Mar.) ; Bariboj ; warch (Pb.) ; Vashambu (Tam.); Vasa, wasa, wadaja (Tel.) ; Vashampa (Mal.) ; Baje (Kan.)

Habitat :—Cultivated in damp, marshy places in India ; exceedingly common in Manipur and Naga Hills.

An aromatic marsh herb. Root-stock creeping, very aromatic and branching, as thick as the middle finger. Leaves with a stout mid-rib, 3-6in. by $\frac{2}{3}$-$1\frac{1}{2}$in., bright-green, acute, thickened in the middle, margins waved. Spathe 6-30in. long, pedicel (formed often connate pedicels and spathe) $1\frac{1}{2}$-$1\frac{1}{4}$in. broad. Peduncle $\frac{1}{8}$-$\frac{3}{8}$in. broad, leaf-like. Spadix 2-4in. by $\frac{1}{2}$-$\frac{3}{4}$in. diam obtuse, slightly curved, green. Sepals as long as the ovary, scarious. Anthers yellow. Fruit turbinate, prismatic, top pyramidal.

Uses :—The aromatic rhizome or root-stock is considered emetic in large doses, and stomachic and carminative in smaller doses. (U. C. Dutt.) It is a simple useful remedy for flatulence, colic, or dyspepsia, and a pleasant adjunct to tonic or purgative medicines. It is also used in remittent fevers and ague by the native doctors, and is held in high esteem as an insectifuge, especially for fleas. In Voigt's Hortus Suburbanus Calcuttensis occurs the following (taken from Thomson's Mat. Med) : " The root has been employed in medicine since the time of Hippocrates. By the moderns it is successfully used in intermittent fevers, even after bark has failed, and it is certainly a very useful addition to Cinchona. It is also a useful adjunct to bitter and stomachic infusions.' It is also much valued by the Manipuris, especially in the treatment of coughs or sore-throats. For this purpose a small piece is chewed for a few minutes. It contains a bitter principle, acorine and an alkaloid calamine, useful in dysentery (I. M. G. 1875, p. 39.)

The root used by the free Indians of Hudson's Bay territory in coughs. Mr. Holmes remarks that " it is not a little singular that there is hardly a country where this plant grows that the rhizome is not used in medicine. (Ph. J. Oct. 18, 1884, p. 302.)

" In Meerut the rhizome, with bhang and ajowain in equal parts, is powdered and used as a fumigation in painful piles." (Surg.-Maj. W. Moir and Asst. Surg. T. N. Ghose, Meerut.) "I found the root extremely useful in the dysentery of children, and also in bronchitic affections—*vide* Ind. Med. Gaz. for

Feb. 1875, p. 39, for further particulars." (Surg B. Evers, M.D., Wardha.)

As a stomachic in flatulency, in the form of infusion,

Bruised root	...	...	...	1 oz.
Boiling water	...	...	...	14 „

Dose: 1 ounce and a half thrice daily. (Surgeon C. M. Russell, Sarun.)

" The root, rubbed up with water or spirit, is used as a counter-irritant to the chest in the catarrh of children. It is generally supposed that the smell is disliked by the cobra, on which it produces a narcotic effect. For this reason it is cultivated near dwellings and chewed by snake-catchers." (Surgeon H. McCalman, M D, Ratnagiri.) " Bach is commonly used to allay distressing cough. I use it much for this purpose, with excellent results A small piece of the dried root stock kept in the mouth acts better than many cough lozenges. It produces a warm sensation in the mouth and a beneficial flow of saliva" (Surg.-Maj R. L Dutt, M.D., Pubna.)

" The rhizome is emetic, nauseant, antispasmodic, carminative, stomachic, stimulant, and insecticide. As an emetic it is more nauseant and depressent than Ipecacuanha, and it is therefore useful in most of the diseases in which the latter is indicated, including dysentery. It is one of the two vegetable drugs in this country which act efficiently as emetics in so small a dose as 30 grains. It should not be used in more than 35 grains, and in 40 grains its action is very violent and obstinate. It is a good remedy in asthma, to relieve which, it should be first used in pretty large or nauseant doses (15 to 20 grains) and then repeated every 2 or 3 hours in smaller or expectorant doses (10 grains) till relieved. Among other diseases which are most benefited by this drug are bronchial catarrh, hysteria, neuralgia, and some forms of dyspepsia. The rhizome can also be used in the form of a tincture or an infusion." (Hony. Surg. Moodeen Sheriff, Madras.)

" The rootstock is burnt to charcoal, then pulverised. 10 to 20 grains of this powder mixed with water is given to counteract

the effect of croton. Is considered as an antidote in cases of croton-poisoning." (Surgeon W. A. Lee, Mangalore.)

"The burnt root acts as an astringent in infantile diarrhœa." (Asst. Surg. Ruthnam T. Moodelliar, Chingleput.) "In 3-grain doses it is very effectual in relieving the colic of small children." (Surg.-Maj. John North, Bangalore.)

"In Western India it is used externally as an application on bruises and rheumatism rubbed up with the spirits made from the Cashew-nut fruit." (Surg.-Maj. C. T. Peters, South Afghanistan.)

Powdered rhizome is used for removing fleas from water in which the rhizome is steeped for a day or more, and is given to fowls for the same purpose (K. R. K.)

Gildemeister and Hoffman (Volatile Oils (written under the auspices of Schimmel & Co.), 302) say that though the oil has been repeatedly examined no satisfactory insight into its chemical nature has been obtained. It is used in 'the manufacture of liquors and of snuff," but is less in demand than formerly for medicinal purposes. Native Medical practitioners consider the rhizome in large doses an emetic, in small doses tonic or stomachic and carminative. It is prescribed in cases of fever, rheumatism and dyspepsia, as well as for flatulence even in infants. It is also a pleasant adjunct to tonic or purgative medicines, and as an aromatic stimulant is recommended for catarrh and distressing coughs Dr. Childe, Second Physician to the Sir Jamsetji Jijibhai Hospital, Bombay, tried an authentic tincture for malaria, dyspepsia, dysentery and chronic bronchitis, and after careful experiment pronounced it inert. Linschoten, who studied the cultivation of sweet-flag in Gujarat and Deccan (A. D 1598), mentions a preparation called arata (a mixture of the rhizome of sweet-flag with garlic, cumin seeds, salt, sugar and butter) which was used as a strengthening medicine for horses. Nicholson (Man. Coimbatore, 247) refers to its use in the treatment of foot and mouth disease. [Cf. also Taleef Shereef (Playfair, transl.) 1833, 34.]—(Watt's Commercial Products of India, p. 24).

The following constituents have been recognised in the essential oil of Acorus calamus :—Free normal heptylic and palmitic acids, eugenol, asaryl aldehyde, esters of acetic and palmitic acids, the crystalline body, C_{15} H_{26} O_2, m. pt. 168 °C. named Calameone and asarone, C_{12} H_{16} O_3. Asarone forms a solid compound with phosphoric or arsenic acid, in the same manner as cineol (eucalyptol). During the reaction it becomes polymerised, forming parasarone $(C_{12}$ H_{16} $O_3)_3$, a product which becomes transparent and vitreous at 178 °C., and melts at 203°C., and is readily soluble in most organic compounds.—J. S. Ch. I, 15-10-1904, p. 949.

N. O. CYPERACEÆ.

1324. *Kylinga triceps Rottb.*, H.F.B.I., VI. 587.

Sans :—Nirvisha.

Vern. :—Nirbisi (H.); Svetagothubi, nirbishi (B.); Mottenga, peemottenga (Mal).; Mustu (Mar.).

Habitat –From N-W. India and Sind to Bengal, Burma and Ceylon.

Leaves as long as (rarely longer), but usually shorter than, the stem, $\frac{1}{7}$-$\frac{1}{6}$ in. broad, linear, acute. Spikes ovoid-oblong or subcylindric, usually 3 together (rarely solitary), the middle one the largest, $\frac{1}{6}$-$\frac{1}{4}$in. in diam.; rhachis clothed, after the fall of the spikelets, with the persistent lower glumes; bracts beneath the head 3-4, leaf-like, up to 3in. long. Two lower glumes hyaline. the lowest lanceolate, acuminate, $\frac{1}{20}$in. long, the second ,anceolate or suborbicular, the third and fourth herbaceous membranous, green, not speckled with brown, ovate-lanceolate, obtusely apiculate, strongly nerved, the uppermost (fourth rather the longest, $\frac{1}{12}$-$\frac{1}{10}$in. long. Stamens 2. Nut oblong or ellipsoid-oblong, yellowish-brown, much compressed, $\frac{1}{15}$in. long; style with 2 filiform stigmas, together nearly as long as the nut. (Cooke).

1325. *K. monocephala, Rottb.* H.F.B.I., VI. 588, *Roxb.* 61.

Habitat : -Common throughout India.

Sparsely hairy, stems 2-12in., usuully solitary, erect from a creeping rootstock. Leaves shorter than the stem, $\frac{1}{10}$-$\frac{1}{6}$ in. broad. Spikes solitary rarely, two or three, the lateral very small, medium $\frac{1}{4}$-$\frac{1}{3}$in. diam; rhachis naked or pitted after the fall of the spikelets, the lowest glumes being for the most part deciduous; bracts long, narrow; spikelets $\frac{1}{10}$in., 1-fid; glumes : I, lanceolate, very variable in length and venation acuminate, with sometimes a capillary point. II, broadly ovate, tip rounded, veins few. III and IV, green, sparingly speckled with brown, cuspidately acuminate, keel dorsally winged about the middle, wings spinulose, veins 6-8 in each, upper longest, more or less

falcately incurved, anthers small. Nut obovoid or oblong apiculate pale red-brown, style longer or shorter than the nut Flowers all the year round. The wings of the two upper glumes sometimes undeveloped, but the keel is always spinulose and the species may always be recognized by their glumes having their tips narrowed with long cusps. (Trimen.)

Uses:—The two above-mentioned plants are the Nirvisha of Sanskrit medical writers, who describe them as antidotal to certain poisons. Rheede describes K. triceps and K. monocephala as having similar properties, and states that the former plant is called Coquinha by the Portuguese. In Malabar, a decoction of the roots is used to relieve thirst in fevers and diabetes, and oil boiled with the roots to relieve pruritus of the skin. He also states that they distil an oil from the roots, which is of a dark yellowish-green colour, pleasant odour and pungent taste, and which is used for the same purposes as the decoction and to promote the action of the liver.

Irving states that K. monocephala is used at Ajmere as an antidote like zedoary, and Roxburgh notices its use as an antidote in Bengal. These plants have the odour, and apparently all the qualities, of Cyperus rotundus.

1326. *Juncellus inundatus, Clarke*, H.F.B.I., VI. 595.

Syn.:—Cyperus inundatus, Roxb. 68.

Vern.:—Pati (B. & H.).

Habitat:—In abundance on the low banks of the Ganges and near Calcutta. Bengal, from Sylhet to the Sea.

A stout perennial. Root jointed, creeping, stoloniferous. Stem 2-4ft. high, about as thick as the finger, triquetrous. Leaves numerous, radical surrounding the base of stem, most deeply channelled on the inside, and keeled on the back. Rhachis of spike glabrous, 1-2in. universal involucre compound of 4-5 leaves of very unequal lengths, the largest being 2ft. or more long, and the shortest as many inches; partial involucre subulate. Umbel decompound, erect, about a span long.

Spikelets often $\frac{1}{8}$-$\frac{1}{6}$in. apart, sessile, diverging, lanceolate, rigid, obtuse. Glumes obtuse, 5-7-nerved. Stamens 2:—style bifid. Nut longer than half the glume, more or less compressed, not equilaterally trigonous, obcordate, smooth.

Uses:—The tubers are used as a tonic and stimulating medicine. (Irvine.)

1327. *Cyperus scariosus*, *C. Br.* H.F.B.I., VI. 612.

Syn.:—C. Pertenuis, Roxb. 66.

Sans.:—Nagar-mustaka.

Vern.:—Nâgar-mothâ (H.); Nagar-mutha (B.); Nâgar-motha (Dec); Muttah-kâch (Tam.); Tungo-gaddala vîm (Tel.); Vomonniu (Burm.); Lawala (Mar.); Kora kizhanna (Mal.); Konuarigadde (Kan.); Soadekâfi (Arab.); Mushki zamen (Pers.).

Habitat:—Bengal, Pegu. Common in Sunderban.

Tall, glabrous, stolons slender, $\frac{1}{3}$-2 by $\frac{1}{16}$in., clothed by elliptic acute lax striate concolorous scales $\frac{1}{8}$in. long. Stems 16-36in. long; at top $\frac{1}{2}$-$\frac{1}{16}$in. in diam. slender; triquetrous. Leaves variable, usually short (less than $\frac{1}{3}$ stem), sometimes much longer, sometimes 0, narrow, weak. Umbel thin; rays slender, sometimes up to 3 n long, sometimes not $\frac{1}{1}$in.; contracted. Bracts nearly always as the leaves, *i.e.*, hardly any when leaves short, exceeding inflorescence when leaves longish. Spikelets linear pale straw colour. (C. B. Clarke.)

Uses:—The root is officinal, and considered cordial, stomachic, and desiccant, and is used for washing the hair. Also regarded as diaphoretic and diuretic. The root is given in conjunction with Valerian in cases of epilepsy. The root is astringent, useful in diarrhœa. A decoction is used in gonorrhœa and also in syphilitic affections. (Dr. Peacock in Watt's Dic.)

In the Concan, Nâgarmoth, *Solanum indicum Tinospora cordifolia*, Ginger and Embelic myrobalans, of each 2 tolas, are powdered and divided into 5 parts, and one part taken daily in decoction with a little honey and long pepper as a febrifuge. In dysentry, Nagarmoth, Mocharas, Lodhra, Daitiphul (*Woodfordia floribunda* flowers), unripe Bael fruit, and the seeds of

Holarrhena antidysenterica are ground with whey and molasses and given in 6 massa doses. In famine seasons Nagarmoth has proved a valuable resource to the poor. (Dymock).

1328. *C. rotundus, Linn.* H.F.B.I., VI. 614.

Syn. :—C. hexastachyus, *Rottb.* Roxb. 66.

Sans. :—Mustâgundrâ, bhadramuṣti, mustakka, dhanakûṭa.

Vern. :—Mustâ, barikmoth, kore-ki-jhâr (H.); Muthâ, mothâ, (Beng.); Batha-bijir (Mundari); Utrubanda, (Uraon); Tandi-sura (Santal); Bimbal (Mar.); Motha (Guz.); Koraikilangu, tulam, (Tam.); tunga-muste, mustakamu, (Tel.); koranari gadde, tungahullu (Kan); Kalanduru (Sing).

Habitat :—A very common and troublesome weed in Ceylon. A pestiferous weed all over India. The tubers yield a perfume.

Perennial herbs flowering all the year. Rootstock small, tuberous, stoloniferous. Stolons elongate, slender, bearing ovoid, hard, tunicate, black, fragrant tubers $\frac{1}{3}$-1in. diam. root-fibres wiry, covered with flexuous root-hairs. Stems subsolitary, 6-24in., slender, trigonous below, triquetrous above, base sometimes tuberous. Leaves subradical, shorter or longer than the stem, narrowly linear, $\frac{1}{6}$-$\frac{1}{3}$in. broad, finely acuminate, or narrowed from the middle to both ends, flat, flaccid, 1-veined. Umbel simple or compound, primary rays 2-8, unequal, very slender, bearing short spikes of 4-10 slender spreading red-brown spikelets (inflorescence sometimes, contracted into a head); bracts 3, longest up to 7in.; spikelets $\frac{1}{2}$-1 by $\frac{1}{16}$in., linear, acute, slightly compressed, 10-20-fid; pale or dark red-brown; rhachilla very slender, wings elliptic; glumes about $\frac{1}{15}$-$\frac{1}{10}$in., closely or loosely imbricate, subereet, ovate, obtuse, dorsally green, hardly keeled, streaked with red brown, 5-7-veined, sides broadly membranous, margins and tip narrowly scarious; stamens 3, anthers long, narrow muticous. Nut $\frac{1}{3}$ the length of the glume, obovoid or oblong, obtuse, trigonous, black, opaque, granulate, style shorter than the nut. Stigmas three, capilarry. (Trimen.)

Uses :—Roots are used medicinally as a diaphoretic and astringent. Stimulant and diuretic properties are also attributed to them. They are further described as vermifuge. In native

practice they are held in great esteem as a cure for disorders of the stomach and irritation of the bowels. The bulbous roots are scraped and pounded with green ginger, and in this form, mixed with honey, they are given in cases of dysentery in doses of about a scruple. (Taylor's Med. Top. of Dacca.) In the Concan, the fresh tubers are applied to the breast in the form of *lep* as a galactagogue. (Dymock.) The roots are in Chutia Nagpur used in fever. (Campbell.)

Arabian and Persian writers describe the drug as attenuant, diuretic, emmenagogue and diaphoretic. They state that it is prescribed in febrile and dsypeptic affections, and in large doses as an anthelmintic, and externally as applied to ulcers or used as an ingredient to warm plasters. (Dymock)

1329. *C. esculentus, Linn.*, H.F.B.I., VI. 616.

Vern. :—Kaseru, dila (Pb.).

Habitat :—From the Punjab to Nilgiri Mounts scattered, but not common.

Stem at base erect. Stolons lateral, long, very slender, with small pale scales, often disappearing after the tubers are formed ; tubers (ripe) woody ; more regularly zoned than those of C. rotundus. Leaves and bracts long. Spikelets yellow or yellow-brown. Glumes over nearly their whole breadth plicate-striate; (otherwise as *C. rotundus*). Glumes in fruit slightly rigid, so that they are less closely imbricated (than in *C. rotundus*), the spikelets more turgid. So close to *C. rotundus* that it is much mixed with it in many herbaria. (C. B. Clarke.)

Use : —In the U. P. the root is officinal as kaseru (Stewart).

It so closely resembles C. rotundas that it is highly probable the reputed discoveries of it in India and elsewhere are in some instances at least due to mistaken determinations. It has, however, been recorded as found in one or two localities in the Punjab and in the Nilgiri hills, but nowhere common. It thus no doubt exists in India, but until fresh investigations have been made it is perhaps desirable to leave the matter in this position. Repeated efforts have, however, been put forth (so it has been affirmed) to introduce the cultivation of this plant, but with absolute failure everywhere. The present species, therefore, contributes no known portion of the supply of edible Cyperus tubers in India. Of other countries it is reported the tubers are often roasted, then ground to a powder, and used in the preparation of chufas coffee or chufas chocolate. [Cf. Kew Mus. Guide, 1895, No. 2, 59.] (Watt.).

1330. *Scirpus grossus, Linn.*, H.F.B.I., VI. 659; Roxb. 77.

Sans. :—Kaseruk.

Vern :—Kaseru ; (H.), kesûr (B.) ; Kasaṛâ (M.); Kaserudila, (Pb); Gunda tinga gaddi (Tel.).

Habitat :—Throughout India. Very common in the Konkan, principally Salsette (Thana marshes). (K.R K.).

A very large annual aquatic or marshy herb. Rootstock stout, with thick root fibres, stoloniferous or not. Stem 6-16 ft., as thick as the little finger, triquetrous, spongy, angles smooth, sides concave. Leaves few, radical, 2-3 ft. long by $\frac{1}{2}$in. broad, triquetrous, finely acuminate, coriaceous, margins smooth or scaberulous. Sheath long, open. Spikelets $\frac{1}{8}$-$\frac{1}{4}$in.; globose or globosely ovoid, dark brown, in large corymbiform decompound terminal open or contracted umbels 3-8in. diam. rays rigid, erect or spreading, upto 5in. long. Rhachilla slender. Bracts very large, upto 3ft. by $\frac{1}{2}$-$\frac{3}{4}$in. broad at the base, flat, leaf-like, margins scaberulous. Glumes rather loosely imbricate, membranous, orbicular, $\frac{1}{12}$in. diam. concave, almost hemispheric, slenderly keeled above the middle, tip rounded ; hypogynous bristles, 6, or fewer, unequal, retrosely scabrid. Stamens 3, anthers linear, sub-acute. Nut $\frac{1}{16}$in.. obovoid, trigonous, dark brown or black, shining, tip conical, style slender, stigmas 3. (Trimen.)

Uses:—The root has astringent properties, and is given in diarrhœa and vomiting (Dymock.) If in addition to its value as a delicate article of food it is really useful in diarrhœa a congee made of it with milk will be a very suitable form of nourishment in diarrhœa and vomiting. I can bear testimony to its bland and soothing properties. (K. R. K.)

Kesur is used to remove the taste of medicine from the mouth. It is chewed also for the purpose of checking sickness. I have often seen it used but I cannot say whether it acts beneficially. (Dr. R. L. Dutt in Watt's Dic.)

N. O. GRAMINEÆ.

Erect decumbent or creeping herbs, or in Tribe Bambuseæ shrubs or trees. Stem terete or compressed, jointed; internodes solid or hollow. Leaves simple, usually long and narrow, entire, parallel-nerved, with a sheathing base distinct from the blade; sheath split to the base (very rarely entire) with often a transverse hyaline erect appendage (ligula) at the union with the blade, facing the latter. Inflorescence terminal, rarely also from the upper sheaths, consisting of spicate racemed capitate or panicled spikelets. Spikelets of three or more alternate distichous bracts (glumes), of which the two lowest are normally empty, and the succeeding, if more than one, are arranged on an axis (rachilla), and are all or some of them flowering; within each flowering glume and opposite to it is an erect narrow 2-nerved scale (palea), the margins of which are infolded towards the glume and enclose at the base the true flower. Flowers uni-or bisexual, consisting of 2, rarely 3 or 6 microscopic scales (lodicules) representing a perianth, and stamens or a pistil, or both. Stamens 3, rarely 1, 2, 6, or very rarely many, hypogynous; filaments capillary; anthers versatile, fugacious, of two parallel cells, with no apparent connective; pollen globose. Ovary entire, 1-celled; styles 2, rarely 3, free or united at the base, usually elongate, and exserted from the sides or top of the spikelets clothed with simple or branched stigmatic hairs; ovule erect, anatropous. Fruit a seed-like utricle (grain) free within the fig. glume and palea, or adherent to either or both; pericarp very thin, rarely thick or separable from the seed. Seed erect; albumen copious, mealy; embryo minute, at the base of and outside the albumen; cotyledon scutelliform, bearing on its face an erect conical plumule, and descending conical radicle. (Hooker.)

1331. *Oryza Sativa, Linn.*, H.F.B.I. VII., 92; Roxb. 306.

Sans:—Anna, dhânya, Tâṇḍula, vrihi; nivara.

Vern:—Châval (H); Dhân, Chaul (B); Bhât (M); Arisi

(Tam); Biyamu (Tel); Akki; Bhatta; nellu nellu (Kan); Ari (Mal).

Habitat:—Indigenous in marshes of Rajputana, Sikkim, Bengal the Khasia hills, Central India and the Circars.

Annual. Stems numerous, varying in height from 2-10 ft, lower portion floating or creeping, erect above, cylindrical, jointed, smooth, striate. Leaves with long close sheaths, the lower ones without blades; ligule prominent, often an inch in length, lanceolate, acute; blade linear, tapering, acute, 1-2 ft. long, and upwards of an inch in width, pale green, rough, edges serrulate and armed with minute forward prickles; midrib prominent. Panicles narrow, 8 in. to 1 ft. or more in length, at first erect, becoming more or less drooping as the grain ripens; rachis flexuose, angular, hispid, with tufts of soft hair at the base of the branches Spikelets laxly disposed, stalked, 1-flowered, articulated with the swollen summit of the pedicel Glumes small, the outer a little the longer, lanceolate acuminate, 1-nerved; pales 2, equal, longer than the glumes, boat-shaped, clothed with short bristly hairs especially at the upper part, coriaceous, persistent, pale green, becoming white, yellow, reddish-yellow or nearly black as the grain ripens; lower pale 3-nerved, blunt, acute or ending in a stiff smooth awn which often exceeds the spikelet. Lodicules 2, broad, fleshy, semi-transparent. Stamens 6, hypogynous; anthers linear, protruding from the pales when in flower. Ovary smooth, tapering; styles 2, about as long as the ovary; stigmas red, composed of rough spreading hairs. Fruit (the grain) enclosed in, but not adhering to, the persistent pales, oblong-ovoid, smooth, somewhat compressed. (Duthie).

Uses:—In his "Materia Medica of the Hindus," Dr. U. C. Dutt writes:—

"The three principal classes of rice are Sali or that reaped in the cold season, Vrihi or that ripening in the rainy season, and Shashtika or that grown in the hot weather in low lands. This last is reaped within sixty days of its sowing. The varieties of each of these three classes of rice are numerous and

confounding. Rakta sali popularly known as Daudkhani is the variety of rice that is considered superior to all others and suited for use by sick persons. The preparations of rice used in sick diet and described in Sanskrit medical works are as follows :—

यवागू, Yavâgû or powdered rice boiled with water for the use of the sick and convalescent. It is made of three strengths, namely, with nine, eleven and nineteen parts of water, called respectively Vilepi, Peya and Manda. Sometimes, instead of water, a decoction of medicinal herbs is used in preparing yavagu. Thus, for example, if it is ordered to give the patient yavagu made with ginger and long pepper, the process adopted in preparing it is as follows. Take of dry ginger and long pepper, one tola each, boil in four seers of water till reduced to two and strain. Now take nine, eleven or nineteen parts of this strained decoction and one part of powdered rice for making yavâgû of the strength ordered.

लाजा, Lâjâ, (Vern. Khai), is paddy fried in a sand bath. The husks open out and the rice swells into a light spongy body. It is considered a light article of diet suited to invalids and dyspeptics.

भृष्टतण्डुल, Bhrishta taṇḍula, (Vern Muri) is rice fried in a sand bath. This is also a light preparation of rice and is given to sick persons as a substitute for boiled rice. It is also much used by the poorer classes for tiffin and early breal fast.

पृथुक, Prithuka, (Vern. Chura). To prepare this, paddy is moistened and lightly fried. It is then flattened and husked. This preparation of rice is given with curdled milk (dadhi) in dysentery. It is well washed and softened in water or boiled before use.

पायस, Pâyasa is a preparation of rice with nine parts of milk.

तण्डुलाम्बु, Tandulâmbu is water in which unboiled rice has been steeped. This sort of rice-water is sometimes prescribed as a vehicle for some powders and confections."

Boiled rice, when hot, or if not so, made hot by steeping it in boiling water for sometime, has been used for making poultice as a substitute for linseed meal or flour.

Regarding the use of rice in the treatment of Diabetes, see my brochure "Diabetes and its Dietetic Treatment," (8th Edition, 1917). B. D. B.

During the expedition to Egypt the soldiers were fed almost exclusively on rice and their health suffered in no way. It transports easily, and keeps well as shown by analyses after 12 years, and is therefore an advantageous food material in times of peace and war.

Decorticated rices from the principal localities, Carolina, India, Java, Japan, Piedmont, Saigon (Cochin-China), show a percentage composition varying between the extremes quoted below :—

	Water.	Proteids.	Fat.	Amyloids.	Fibre.	Ash.
Maximum	16 00	8·82	·75	81·35	·42	·58
Minimum	10·20	5·50	·15	75·60	·18	·42

Crude rices contain a higher proportion of nitrogenous and fatty substances and ash, the limits being as follows :—

	Water.	Proteids.	Fat.	Amyloids.	Fibre.	Ash.
Maximum	13·30	9·05	2·50	75·60	2·38	2·20
Minimum	11·20	6·18	1·85	73·85	·03	1·20

Balland found that there was no connection between the size of the grain and the proportion of nitrogenous matter, and demonstrated from his analyses that rice has more value as a food than is commonly supposed.

The proteins or albuminoids of rice have recently been studied by O. Rosenheim and S. Kajuria. These chemists find 7 per cent. of total protein present in rice, of which 0·14 is a globulin, 0·04 an albumin, and the remainder a protein which like the glutenin of wheat is soluble in dilute alkali. The name oryzegenin is suggested for it.

Unmilled rice contains between 2 and 3 per cent. of oil, but in the process of polishing most of this oil is removed with the aleurone layer. The bran from rice mills in Rangoon and elsewhere contains a considerable amount of oil which frequently amounts to 20 per cent., and for this purpose is exported from India to Europe for supplying a material in soap manufacture. On account of the presence of an enzyme in the bran, the oil extracted has usually a high acidity. A recent analysis of rice oil has been published by M. Tsujimoto (1911) recording the following physical and the chemical characters: Specific gravity at 15°. 0·927; acid value, 34·75; saponification

value, 184·87 ; iodine value (Wijs), 107·6 ; unsaponifiable matter, 4·78. Fatty acids : melting point, 32·5° ; neutralization value, 197·6 ; iodine value, 107·82. The approximate composition of the total fatty acids was calculated as, palmitic 20, oleic 45, isolinolic 35. (Agricultural Ledger.)

1332. *Coix Lachryma-Jobi, Linn.*, II.F.B.I. VII, 100.

Sans : —Gavedhu, gavedhuka.

Vern : —Gurgur, (B) ; jargadi, (Sant.) ; sankhru, sankhlu. gargari-dhan, kaiya, baru, dabhir, ganduta, garun, kasei, gulbi-gadi, gurlu, (H.) ; sanklu, (P.) ; Ranjondhala ; (Mar.) kasai, (Guz) koamonee, (Assam), sikra kraou, koa sangti, (Naga) ; jhonki, (Cach.) ; mim, (Lush.) ; chang-mim-khombi, the edible form being simply nim (Manipur) ; gyeik aing, (Bur.) ; kukirrindi kanbu, (Sing.) ;

Habitat :—Inhabits ditches and rice-grounds in Bengal the Konkan and Deccan and throughout the hotter and damp parts of India.

An annual, stem 3-5 ft. or more, stout, rooting at nodes, internodes smooth, polished, leaves 4-18 by 1-2 in., narrowed from a broad cordate base to an acuminate tip, smooth on both surfaces, margins spinulosely serrate, midrib stout, veins many, very slender, sheaths long, smooth, ligule a very narrow membrane. Raceme 1-2½ in. long, nodding or drooping from very long penduncles. Rhachis within the bract slender, above it stout, notched at nodes. Male spikelets subsecund imbricating in pairs, very variable in size ½-¾ in. long. Glumes 4 ; I and II subequal, empty, rigid, or herbaceous ; I keeled along the inflexed margins ; III and IV hyaline, paleate, triandrous or empty. Anthers orange-yellow. Fruit from broadly ovoid to globose, ¼-½ in. diam ; pale bluish grey, polished, osseus.

Uses :—A Missionary, writing of Tonkin to M. Romanet du Caillaud, said that Job's tears made a refreshing drink was a good blood purifier and excellent diuretic. The gruel prepared from the ground seed he observed as also Eau de Larme-de-Job was extensively employed in the summer to cool the body. By the Tonkin people it is spoken of as the "grass of life and healte"

is believed to neutralise' the miasma of the air and to purify water when boiled like tea with a small quantity of Coix flour and set by to cool before being used. In India Coix can hardly be said to enjoy any reputation for medicinal virtues. The Rev. Dr. Campbell tells us that among the Santals the root is given in strangury and in the menstrual complaint known as silka. Dymock (Veg. Mat. Med.) says the seeds are sold in the drug shops of Bombay under the name of kassgi bij. The Pharmacographia Indica says that the wild form only is used medicinally and that it is considered strengthening and diuretic. (Watt).

The following detailed analysis gives the composition of the grain in 100 parts, as published by Professor Church and subsequently by the Haarlem Museum authorities, by Mr. Hooper of the Indian Museum Report and by Drs Paton and Dunlop in The Agricultural Ledger No. 6 of 1904 page 50.

	Professor Church.		Haarlem Museum, 1901 (cultivated grain).	Indian Museum, 1901-02 (cultivated grain)	Paton and Dunlop, 190· (wild plant)
	1886 (wild plant).	1901 (cultivated grain).			
Water ...	13·2	14·8	13.91	8·00	10·74
Albuminoids...	18·7	16·6*	21·72†	22 46	18·81
Starch ...	58 3	60·1	55 29	61·82	59·55
Oil ...	5·2	5·8	1·30	4 92	6·2
Fibre ...	1·5	0 9	1 48	·70	1·28
Ash ...	2 1	1·8	1·79	2 10	3 4

1333. *Zea Mays, Linn.*, H.F.B.I., VII. 102.

Vern :—Makka, Bhutta (H).

Habitat :—Cultivated throughout India.

A tall annual grass. Stems 4-10 ft. high, smooth, striate, solid, the central portion soft and spongy. Leaves numerous, close together; sheaths large and full, somewhat compressed, auricled at the base, upper part hairy; ligule short, truncate, torn; blade of leaf 1-1½ ft. long, linear lanceolate, acute, smooth; midrib prominent below; margins wavy, ciliate. Flowers unisexual; spikelets monœcious, 2-flowered; male spikelets many, arranged in pairs on the spike-like branches of a large terminal drooping panicle; glumes 2, about equal, tinged with

* 2·66 nitrogen. † 3·47 nitrogen.

purple; pales 2, nearly equal, falling short of the glumes, lower 3-nerved, upper 2-nerved and with inflexed margins; lodicules fleshy, truncate; stamens 3, protruded; female spikelets nearly sessile, closely arranged in pairs on a thick spongy axis, forming a compact cylindrical spike surrounded at the base by broad imbricated bracts, upper flower of spikelet barren; glumes 2, broad, thick and fleshy at the base, the lower emarginate, ciliate, the upper truncate; pales 2, lower broad and blunt, the upper much longer, closely adhering to the ovary; lodicules none; ovary sessile, ovoid, styles very long, filiform, drooping. Fruit (the grain) roundish or reniform, compressed, smooth, shining, yellow, white, red or spotted. (Duthie.)

Uses:—It is considered by Mahomedan physicians to be resolvent, astringent, and very nourishing; they consider it to be a suitable diet in consumption and a relaxed condition of the bowels. In Europe it is much used as a valuable article of diet for invalids and children under the names of *Polenta* (Maize meal) and *Maizena* (Maize flour). In Greece the silky stigmata are used in decoction in diseases of the bladder, and have lately attracted attention in America under the name of *Corn silk*, of which a liquid extract is sold in the shops as a remedy in irritable conditions of the bladder with turbid and irritating urine; it has a marked diuretic action The meal has been long in use in America as a poultice, and gruel is also made of it. In the Concan an alkaline solution is prepared from the burnt cobs and is given in lithiasis.

In the United States for starch manufacture from maize it has been found desirable to get rid of the oily embryo—this is done by machinery. The embryo is too rich for feeding stock unless the oil is removed—this is done in the hydraulic press, and the cake when ground into meal is very valuable as a food for stock. The oil promises to be useful for medicinal purposes instead of olive oil.

Chemical composition.—The avorage results of the analysis of three varieties of maize in an undried state by Polson, yielded in 100 parts, 54·37 starch, 8·88 nitrogenous substance, 4·50 fat, 2·70 gum and sugar, 15·77 cellulose, 12·16 water, and 1·67 ash. Poggiale found on an average in 160 parts of the dried grain, 64·5 starch, 6·7 fat, and 9·9 nitrogenous substance. Church found it to

contain water 12·5, albuminoids 9·5, starch 70·7, oil 3·6, fibre 2·0, ash 1·7 American grain contained 1 per cent. more fat than Indians.

In the unrefined state the oil has a specific gravity of ·916 at 15°C., the elaidin test shows the presence of a large quantity of olein. Maize oil is of a pale yellowish-brown colour, with an odour and taste like that of freshly ground corn meal; it belongs to the non-drying group of the vegetable oils does not easily become rancid, and has no purgative action. With alkalies it forms a white soap; it contains fatty acids (free) 0·88, total fatty acids 96·75 per cent., mucilaginous bodies 1·34 The loss sustained by purification is under 5 per cent. (*J. U. Lloyd, Amer. Journ. Pharm.*, July 1888.)

1334. *Saccharum officinarum, Linn.*, H.F.B.I., VII. 118; Roxb. 97.

Vern. :—Ukh, gannâ, ikh, nai shakar, rîkhû, kumad, kusiyâr, katârî (H.); Ik, âk, ûk, kûshiâr, pûri, kullûa, kajûli, (Beng); Akh, ikshu (Sant.); Tû (Newar); Ghenra (Parb.); Uk, akali ehaku (Nep.); Aku (Ur.); Shakar surkh, khand, ganna, kamând, paunda, ikh (Pb.); Kamand (Sind); Gândâ, Sherdi, aos, ûs, kabbu (Mar.); Sheradi, nai-sakar, uns (Guz.); Karûmbû (Tam.); Cheruku, charki, ârukanupula-krânuga, (Tel.); Khabbu, basarimara (Kan.); Karinpa, tebu (Mal).

Habitat :—Cultivated throughout India.

A large perennial grass. Stems many, 6-12ft. high, thick, solid, jointed, polished, yellow purple or stripped; lower internodes short with fibrous roots above each joint. Leaves very large, crowded, lower ones soon falling off; ligule short, entire; sheaths about one foot in length, striate, smooth or with mealy pubescence; blade 3-4ft. long and from 1½ to 2 inches in breadth, acute, smooth on both surfaces, margins minutely serrulate, ciliate at the base; midrib prominent beneath. Panicles large, compound, drooping, feathery, of a greyish colour. Spikelets small, very numerous, 1-flowered, arranged in pairs on alternate sides of the long slender panicle branches, one stalked and the other sessile, each enveloped in an involucre of long white silky hairs; glumes 2, nearly equal, lower 2-nerved and ciliate towards the apex, upper 1-nerved; outer pale wanting, inner shorter than the glumes. Lodicules 2, free, truncate, lobed. Stamens 3; anthers linear, oblong.

Ovary smooth; stigmas 2, densely plumose, purple. Fruit not known. (Duthie.)

Uses:—The root of the sugarcane is said to have been employed in medicine, and to have been considered demulcent and diuretic (U. C. Dutt). In Arabian works on Materia Medica, sugar is described as detergent and emollient, and is prescribed in doses of twenty direms. Many writers speak of it as attenuant and pectoral. It has also been supposed to have virtues in calculous complaints (Ainslie). In the Panjab, Baden Powell says, sugar is considered by the Natives to be "heavy, tonic, and aperient, useful in heat delirium and disorders of the bile and wind." In another part of his work he remarks: "In cases of poisoning by copper, arsenic or corrosive sublimate, sugar has been successfully employed as an antidote, and white sugar finely pulverised is occasionally sprinkled upon ulcers with unhealthy granulations. The Hindus set a great value upon sugar, and in medicine it is considered by them as nutritious, pectoral, and anthelmintic." The use of sugar as an antidote for arsenical poisoning is alluded to by many writers (Chisholm, Voigt, and others).

1335. S. *arundinaceum*, *Retz.*, II.F.B.I., VII. 119.

Syn.:—Saccharum ciliare, *Anders.* S. Sara, *Roxb.* 82.

Sans.:—Gûndra, tejanaka, sharâ, शर .

Vern.:—Sara, sarkanda, sarpat, râmsar, mûnja, sarbar, ikar patawâr Palwa (H.); Sar, (B.); Sar (Santal); Sarkara, sarjbar, kharkâna, kandâ (Pb.); Dargâ, karre (Trans-Indus); Sar (Sind); Gundra, ponika, (Tel.)

The following names are also given to certain portions of the plant in different localities:—Munj (leaf-sheaths), Sar (leaves) (Pb); Bind or vind, culm or flowering stem (Doab); Sararhi (E. Districts of U. P.); Sentha, kâna, lower portion of flowering stem; Sirki, til, upper portion of flowering stem; Thili, upper portion of flowering stem (Lahore); Majori, the entire flowering stem; Tilak, tilon, the flowers (Pb.); Ghua, the flowers (E. Districts, U. P.).

Habitat:—North-West India.

Stem 6—20 ft., erect from a stout rootstocks, $\frac{1}{8}$ in, diam., spongy within, internodes 6—12 in., terete, smooth, uppermost glabrous under the panicle; l. 3—5 ft. by 1—2 in. below the middle, tapering thence upwards to a long filiform point, and slightly downwards to the base, coriaceous, smooth on both surfaces, glaucous beneath, margins spinulose, midrib up to $\frac{1}{4}$ in. broad, shining, veins many, very slender, sheaths terete, coriaceous, mouth not auricled, sides bearded, ligule short, lunate, hairy; panicle 1—2 ft., dense-fld., ovoid or oblong, erect, decompound, rhachis stout, glabrous, branches half whorled, spreading in fl. ascending in fr., filiform; spikes 1—3 in., rhachis filiform, fragile, internodes $\frac{1}{5}$—$\frac{1}{4}$ in., villous, tips obconic; spikelets $\frac{1}{10}$ in., clothed with long, soft, creamy or purplish woolly hairs up to $\frac{1}{4}$ in., long, callus very short; glume I oblong-ovate, acuminate, dorsally convex, margins incurved, 1-veined in the flexures, II lanceolate, acuminate, 1—3-veined, margins above the middle and keel ciliate with long hairs, III oblong, hyaline, obtuse, 1-veined, margin above shortly ciliate, IV smaller, lancolate, subaristately acuminate, margins ciliate above, palea quadrate, ciliate; lodicules irregular in shape; anthers $\frac{1}{20}$ in. (Trimen.)

Uses:—The root is officinal in the Panjab, under the name of *garba ganda*. It is burned near women after delivery, and near burns and scalds, its smoke being considered beneficial. (Stewart.)

1336. *Manisuris granularis, Linn.*, H.F.B.I. VII. 159.

Sans:—Palangini (Ainslie).

Vern:—Trinpali (H); Kangni (Ajmere); Dhaturoghas (Udaipur); Agimali-gadi (Chanda); Ratop (Berar).

Habitat:—Throughout the hotter parts of India.

Annual, erect, much branched grass. Stems 4-30 in. high, slender, compressed softly hairy, leafy; nodes hairy. Leaves 1½ 8 by $\frac{1}{4}$-$\frac{1}{2}$ in., linear-lanceolate, acute or acuminate, flat, hairy on both surfaces or on the lower only with bulbous-based hairs, margins ciliate, base cordate; sheaths much shorter

than the internodes, hispid with bulbous-based hairs; ligule very short, membranous, densely ciliate. Racemes ½-1 in. long, resembling a string of minute beads, solitary or seemingly fascicled in the axils of the leaves, but individually from shortened axillary branches. Sessile spikelets $\frac{1}{16}$-$\frac{1}{12}$ in. long, subglobose; callus tumid, glabrous. Glumes 4; lower invol-gume irregularly foveolate on the back; upper invol.-glume closing the cavity of the lower floral glume, elliptic-oblong, obtuse, 1-nerved; lower floral glume hyaline, shorter than the upper invol.-glume; upper floral glume about equalling the lower, broadly ovate, obtuse; palea similar but a little shorter. Pedicellate spikelets equal in length to the sessile or longer, of 2 equal green glumes about $\frac{1}{10}$ in. long; lower invol.-glume broadly ovate or suborbicular, obtuse or subacute, 5-7 nerved, one margin narrowly folded, the other with a hyaline wing, upper invlo glume boat-shaped, laterally compressed, the keel with a dorsal byaline ciliolate wing (Cooke).

Uses:—In Behar, it is prescribed internally in conjunction with a little sweet oil, in cases of enlarged spleen and liver (Ainslie).

1337. *Andropogon squarrosus, Linn. f.*, H.F.B.I., VII. 186.

Syn.:—A. muricatus, *Retz.* Roxb. 89.

Sans:—Usir.

Vern.:—Khas, bena, panni, senth, gamar, onei, Bâle-ke-ghâns (H.); Khas-khas, (B.); Panni (Pb.); Sirom (Sant.); Vâls (Guz.); Lâvancha (Kan.); Vettiver; romanchamver (Mal.); Vette-ver, (Tam.); Vâlâ, khasakhasa, (Mar.); Kas (Arab. & Pers.)

Habitat:—Throughout the plains of India.

Stems 2—5ft., in large, dense tufts with stout spongy aromatic roots, sparingly branched, as thick below as a goose-quill. Leaves 1-2 ft., subbifarious, narrow acute, erect, keeled, glabrous, margins scabrid; sheaths equitant, glabrous; ligule

obscure. Panicle 4-12 in., conical, erect, rachis stout and erecto-patent filiform flexuous branches glabrous or scaberulous. Spikes slender, joints and pedicels about = the sessile spikelets. Sessile spikelets grey, green, yellow or purplish, $\frac{1}{6}$-$\frac{1}{4}$ in., slightly curved, glabrous, callus obscurely bearded; glumes I coriaceous, acute, 2-4-nerved; II coriaceous, 1-nerved, margins hyaline, keel muricate; III lanceolate, acuminate, 2-nerved, margins inflexed ciliolate; IV = III ciliate; palea very small, obtuse, glabrous. Pedicelled spikelets like the sessile but glume I smooth, IV awnless. (Hooker).

Uses:—By Sanskrit writers the root is described as cooling, refrigerant, stomachic and useful in pyrexia, thirst, inflammation, irritability of stomach, etc. It enters into the composition of several cooling medicines. * * A weak infusion of the root is sometimes used as a febrifuge drink. Externally it is used in a variety of ways. A paste of the root is rubbed on the skin to relieve oppressive heat or burning of the body. This use of the drug appears to have been popular with the ancients. * * An aromatic cooling bath is prepared by adding to a tub of water the following substances in fine powder, namely, root of Andropogon muricatus, Pavonia odorata (bâlâ) red sandalwood, and a fragrant wood called *padma kashtha*. The same medicines are reduced to a thin emulsion with water and applied to the skin. (U. C. Dutt.)

An infusion of the root is given as a febrifuge and a powder in bilious complaints. It is regarded as stimulant, diaphoretic, stomachic and refrigerant. The essence (or otto) is used as a tonic. A paste of the pulverised roots in water is also used as a cooling external application in fevers.

Antispasmodic, diaphoretic, diuretic, and emmenagogue properties have been assigned to it; but beyond being a gentle stimulant diaphoretic, it seems to have no just claims to notice as a medicine. An account of the uses to which it has been applied in Europe is given by Pereira (*Mat. Med.*, Vol. ii., P., i. p. 132). Its uses in native practice are detailed in the Taleef Shereef, p. 14, No. 47. According to the analysis of Geiger,

it contains a resin, a bitter extractive, and a volatile oil. The dose of the powdered root is about twenty grains, or it may be given in infusion (two drachms of the bruised root to ten ounces of boiling water), in doses of an ounce or more. As a medicine, as far as is at present known, it is an article of very minor importance. (Ph. Ind.) "The otto is given in two minim doses to check the vomiting of cholera." (Dr. Houston.) "Used in the form of cigarettes with benzoin, it relieves headache." (Dr. Lancaster)—Watt's Dic.

1338. *A. Iwarancusa*, *Jones*, H.F.B.I., VII. 203.

Syn:—A. laniger, *Desf.*

Sans.:—Lâmajjaka.

Vern.:—Lâmjak, bûr, khâwi, khoi, panni, solâra, san, ibharankusha, karan kusha, ghât-zâri Miriya ban, ganguli, bad, piriya (H. and Pb.); Kârânkusa, ibharankusha (B.); Izkir Pivala-vâla (Mar); Pilo-valo (Guz.).

Habitat:—Dry desert tracts, Lower Himalayan tract, extending to the plains of U. P. and Sind.

Perennial, cæspitose. Stems erect, thick and woolly below. Leaves smooth, glaucous, stiff; blades narrow and convolute. Panicles erect, narrowly oblong, composed of distant fascicles of spikes surrounded at the base by blunt boat-shaped yellowish sheaths. Rachis and pedicels of the awnless male spikelets densely clothed with white hairs. Flowering glumes of hermaphrodite florets minute, transparent, bidentate, and with a very slender bent awn from between the teeth. (Duthie.)

Uses:—Used to purify the blood, and in coughs, chronic rheumatism and cholera It is recommended as a valuable aromatic tonic in dyspepsia, especially that of children; it is also used as a stimulant and diaphoretic both by natives and Europeans, in gout, rheumatism and fever (Baden-Powell.)

The Arabian and Persian physicians describe Idkhir as hot and dry, lithontriptic, diuretic, emmenagogue, and carminative; they recommend it to be boiled in wine as a diuretic; ground into a paste it is said to be a good application to abdominal

swellings; added to purgatives it is administered in rheumatism; the flowers (calyxes) are used as an hæmostatic. (Pharmacogr. Ind. III 563.)

Chemical composition.—From 56 lbs. of the dry grass purchased in the bazar we obtained the large yield of 8½ ozs. of essential oil; it had a specific gravity of '995 at 25° F., and rotated a ray of polarized light 8·0 degrees to the left in a column 200 mm. long. The colour was that of pale sherry. According to Schimmel & Co., the essential oil reminds one of the odour of Elemi oil. Its sp. gr. is ·915, the optical rotation + 34°. It boils between 170° and 250°, and contains phellandrene (*Bericht von Schimmel & Co.*, April, 1892),—*Pharmacogr. Ind. III.* 564.

1339. *A. Schœnanthus*, *Linn.*, H.F.B.I., VII. 201. Roxb. 93.

Syn.:—Cymbopogon martini, *Stapf.*

Vern.:—Rusâ ghâs; musel; mirchia, gand bujina; pâlâ-khari (H.); Aghyâ-ghâs; gandha hena (B.); Rânus (Pb.); Rosegavat; rohisha (Mar).

Habitat:— Central India, the United Provinces; Panjab; the Deccan, and the Central Provinces.

Root perennial, with long wiry fibres. Culms erect, from three to six feet high, often ramous, smooth, filled with a spongy pith. Leaves very long, tapering to a very fine point, smooth in every part and of a soft delicate texture. Sheaths shorter than the joints on full grown plants, with a membranaceous stipulary process at the mouth. Panicles as in A. Iwarancusa; spikelets paired, but with only three joints. Flowers also paired, &c. as in the former species, only there the lowermost pair on the most sessile of the two spikelets are both male, and one of them rests upon a smooth, convex, callous receptacle instead of a pedicel. Rachis jointed, and wooly. Calyx as in A. Iwarancusa. Corolla one-valved, a long black awn occupies the place of the other, which has two small filaments near its base. Nectary, &c. as in the foregoing species. (Roxburgh.)

Mr. R. S. Pearson, I. F. S., F. L. S., in his "Note on the Economic uses of Rosha Grass," published in the Indian Forest Records, Vol. V., Part VII., writes—

From a commercial point of view there are two forms of this botanical

species which are popularly known as "Motia" and "Sofia," although, up to date, these have not been recognized as botanically distinct.

That there is a difference between the two well-known varieties called "Motia" and "Sofia" is evident from the inferior oil yielded by the latter, though Botanists have so far been unable to accept such a classification.

Mr. R. S. Hole, the Forest Botanist, says—

"The structure of the flowers in all the plants is practically identical and I can find no characters of importance to separate them. All the "Motia" plants, however, differ from "Sofia" as regards the wider angle which the leaf blade makes with the culm, a character which was first noticed and published by Mr Burkill. It is doubtful, however, how far this character will prove constant and we must cultivate under varying conditions of soil and moisture the different forms here at Dehra, keep them under observation, collect the flowers at different seasons and prepare oil from them, before we can hope to define satisfactorily constant forms of value."

Uses :—The oil is regarded as officinal in the Indian Pharmacopœia. This oil, occasionally called also Oil of Namur, was first brought to notice in 1825 by Dr. N. Maxwell (Calcutta Med. Phys. Trans., vol i, p. 367), and it was further described in 1827 by Dr. Forsyth (*Ibid.*, vol. iii., p. 213). From a series of trials instituted with it at Madras, by Drs. Cole, Kellie, and Hunter, it appears that as an application in rheumatism its efficacy is chiefly limited to recent cases. In the severer forms and in the chronic stage, the oil, even when undiluted, afforded only slight relief (see Madras Medical Reports, 1855, p. 431, *seq.*) Favourable reports of it have been received from Dr. W. Dymock, Dr. L. W. Stewart, Dr. E. Ross., &c. (Ph. Ind.) The oil is believed to have the property of curing baldness, and to be useful in neuralgia. "A spirit is distilled from the grass with spices, and is said to be useful in indigestion and fever" (Stewart). "The decoction of the grass is a febrifuge and I have used it in cases of cold and feverishness with benefit." (Asst. Surg. Bolly Ch. Sen in Watt's Dic.)

For further information on the uses of the oil consult Mr. Pearson's Note referred to above and also Mr. Puran Singh's Note on the Constants of Indian Geranium Oil, published in the same part of the Indian Forest Records referred to above.

1340. *A. Nardus, Linn.*, H.F.B.I., VII. 205.

Syn. :—A. nardus proper.

Vern. :—Ganjui ; ganjui-kâ-ghâs; pust-buru (H.) ; Kamâ-kher (B.) ; Ganjui ; Usadhana (Mar.) ; Kâmâkshi-pullu ; mândap-pullu ; kâvattam-pullu ; shunnârip-pullu (Tam.) ; Kâmâkshi-kasuvu ; kamanchi-Gaddi (Tel) ; ganda-hanchi-khaddi (Kan.).

Habitat :—Common in the plains and lower hills of the United Provinces and Panjab ; abundant about Travancore.

Rootstock stout, stem tall stout leafy, leaves long narrow, panicle large often supra-decompound oblong or subpyramidal more or less interrupted, branches loosely or closely packed erect at length often drooping, spathes laxly or closely imbricate lanceolate, proper spathes $\frac{1}{3}$-$\frac{3}{4}$ in spikes with 4-5 pairs of spikelets, joints and pedicels rather slender densely or laxly ciliate, sessile spikelets $\frac{1}{6}$-$\frac{1}{5}$ in. lanceolate awned, glume 1 narrowly winged, awn long or short.

Uses :—The oil is officinal in the Indian Pharmacopœia. In its properties the oil resembles that of *A citratus*. The infusion of the leaves in doses of $\frac{1}{2}$ to 2 ounces is used as a stomachic (Irvine's *Mat. Med* of Patna). It is used as a carminative in the bowel complaints of children (Dymock).

1341. *A. citratus, DC.*, H.F.B.I., VII. 210. (*Where it is considered either A. Nardus or A. Schœnanthus*) Roxb. 92

Sans. :—Bhustrina.

Vern. :—Gandha benâ (B.) ; Gandha trina (H.) ; Hirvâcnah or olâchâh (Mar.) ; Lilichâ ; (Guj.) ; Vashanuppulla ; kurpura-pulla (Tam.) ; Nimmagaddi ; chippagaddi (Tel.) ; Pûrhalihulla (Kan.). Hazâr-masâlah (Per.) ;

Habitat :—Cultivated in gardens in India.

Uses :—" The volatile oil of this plant is officinal in the Pharmacopœia of India, where it is described as " stimulant, carminative, antispasmodic and diaphoretic ; locally applied rubefacient." " In flatulent and spasmodic affections of the bowels,

and in gastric irritability, it is a remedy of value. In cholera it proves serviceable, not only by allaying and arresting the vomiting, but by aiding the process of reaction. Externally applied, it forms an excellent embrocation in chronic rheumatism, neuralgia, sprains, and other painful affections." From several trials with Lemon Grass Oil, the Editor feels justified in speaking highly of it, not only as an external application in rheumatism and other painful affections, but as a stimulant and diaphoretic when administered internally. Amongst the natives and Indo-Britons of Southern India, it is one of their most highly esteemed remedies in Cholera; and the Editor has witnessed cases in which it certainly seemed to moderate and check the vomiting, whilst it served to raise the depressed state of the constitution. It is well worthy of future trials, specially in the earlier stages of the disease. Dr. Æneas Ross reports very favourable of a warm infusion prepared by macerating about four ounces of the leaves in a pint of hot water. He states that he has used it very successfully as a diaphoretic in febrile affections, specially in weakly subjects, or when the fever is of a typhoid type. It is much used, and proves a valuable remedy, according to the same authority, in dropsical affections consequent on prolonged attacks of fever so prevalent in malarious countries." (Ph. Ind., p. 255.)

1342. *Avena fatua*, *Linn.*, H.F.B.I., VII. 275.

Vern.:—Kuljud, ganer, gandal, jei (H.); Gozang, ganerjei, Kâsamm, yûpo, ûpwa (Pb.).

Habitat:—Plains and hills of Northern India.

An annual herbaceous grass. Stems 2-4ft. high, erect, polished. Leaves few; sheaths long, smooth, striate, glaucous green; ligule prominent, broad, truncate; blade 5-6in. long, linear lanceolate, tapering from the base, pale-green. Spikelets few, laterally compressed, pendulous, arranged in large loose panicles, usually 2-3-flowered; florets widely open when in flower, one sessile, one-stalked, and a third reduced to a slender-stalked club-shaped rudiment; glumes 2, about equal, ¾-1in.