snakes, at the same time given inwardly about the size of a field bean. It is certainly a most powerful stimulant, in proper hands it might no doubt be used to great advantage in the cure of several disorders. (Roxburgh). Dr. Waring remarks that any good effect which could be expected from it, may, however, be more readily obtained from a mustard poultice. The acrid principle is very volatile; and by the application of heat, or by simple drying, the root becomes innocuous or even wholesome as articles of diet (Ph. Ind.). As an article of food, it relaxes the bowels and thereby relieves hæmorrhoids The wild plant is used as a medicine for plies (T. R. Moodeliar)

1313. *Amorphophalius campanulatus*, *Blume*, H.F.B.I., VI. 513.

Syn. :—Arum Campanulatum, *Roxb.* 629.

Sans. :—Arsaghna; Kanda.

Vern. :—Jangli-suran, Zamin-kand (H); Ol (B); Suran (Mar.); Karu-naik-kizhangu, or karuna-kalang (Tam); Kanda-godda, poti-konda, manchik-anda (Tel.).

Habitat :—Cultivated throughout India.

A perennial stemless herb, with tuberous roots, often 1½ft. in circumference, flowering before leafing every year from the previous year's tuber. The tuber is really and truly an under-ground stem which bears only one spathe-included spadix, after the maturation of which what looks like a stem above-ground is merely the petiole radically developed from the depressed portion of the globose tuber side by side with the spathe and spadix. The tuber has sometimes many bulbils, each of which gives forth no spathe nor spadix, but only a petiole with leaves. Petiole of the main bulb which has flowered already varies in height from 1½-2½ft. in cultivated varieties, often 4ft. 2-4in. thick, rough, clouded dark and light-green, cylindric, softly fleshy, succulent. Leaf formed of the three radiating horizontal divisions of the petiole, 1-3ft. broad. The divisions are di-chotomous, pinnatisect, with a deep channel on the ventral aspect, roundish on the dorsal aspect, slightly scabrous. There

in a terminal raceme, 6-12in. long. Perianth $\frac{1}{8}$in. long, bell-shaped*, 6-parted; segments white, with 3 green ribs in the centre; lip rounded. Stamens 6 at base of segments and shorter. Ovary 3 celled, 3-grooved. Style shorter than the ovary, straight, tapering downward, ovules several in each cell. Capsule $\frac{1}{2}$-$\frac{3}{4}$in., oblong, 3-valved; cells 6-9 seeded. Seeds many, flat, black, $\frac{1}{4}$in. diam.

Uses:—The Hindus use the bulb in the preparation of *chândi-bhasma* or "ashes of silver," which they employ medicinally. "Indian Mahomedan writers evidently consider the Indian squill as identical in medicinal properties with the squill of the Greeks; they prescribe it in the paralytic affections, also as an expectorant, digestive, diuretic, deobstruent and emmenagogue, in many diseases, more especially in asthma, dropsy, rheumatism, calculous affections, leprosy and skin diseases." (Dymock). European writers vary much in their opinions regarding the medicinal properties of the drug. Ainslie states that it "is chiefly employed by farriers for horses in cases of strangury and fever." Roxburgh writes that the bulb is quite as nauseous and bitter as that of the officinal squill; while O'Shaughnessy remarks that bulbs examined by him were inodorous, nearly tasteless, and devoid of any medicinal property. Bidie, Atkinson, U. C. Dutt, K. L De, Dymock and others confirm the statement that the drug is an efficient substitute for Urginea Scilla. Moodeen Sheriff explains the discrepancy by stating that, when young and small, not exceeding a lime in size, it acts as a diuretic, in doses of 10-20 grains, even more powerfully than the officinal

* Mr. H. H. Haines, I.F.S., writes in the *Indian Forester* for July, 1917 p. 337 :—

In the Flora of British India, the perianth is described as campanulate, and this character is given in other works I have consulted including, I regret to say, my own Flora of Chota Nagpur, as, at that time, I had not observed the plant late of an evening. The description of the flowers of Scilla is given as stellate or campanulate, and although that description was not intended to mean in one and the same species, it really does apply to some species of both Scilla and Urginea. If one walks along a fire-line on a moonlight night, all the flowers of Urginea indica, whose night out it is—they only get one each in their lives—will be found wide open, stellately spreading and fragrant. It is then a very graceful pretty plant. Next morning all the flowers are campanulate, in which condition they have always been described.

squill, but that, as it grows larger, it becomes useless. The outer coats are always quite inert. It is also possible, as suggested by O'Shaughnessy, that the medicinal virtues may vary with the season and locality of collection. The officinal squill is well-known to be thus affected. On the Spanish coast, it has been found quite inert in one locality, while as active as usual at the distance of a few miles. A sufficient proof of its value, if collected and stored judiciously, is found in the fact that, for many years, it has been used as a substitute for the officinal squill at the Government Medical Store Depôt in Bombay. The dried bulb met with in bazars sells at from 1 to 2 annas per lb. according to quality. (Dymock.)

"There are several other species of *Urginea* met with in India, and these are doubtless used in some cases as inferior grades. The most general substitutes or adulterants for the above are *Crinum asiaticum* and *latifolium*, *Dipcadi unicolor*, *Pancratium triflorum*."—Watt's Commercial Products, p. 1049.

In the *Indian Forester* for February, 1917, Mr. G. O. Coombs, Extra-deputy Conservator of Forests, writes —

The Director of Industries writes to say that there is no starch in the bulbs, but that, so far as his investigations have gone, they provide a valuable sizing agent, and he has hopes that the size may be taken up by the Cotton Mills. He further states that the bulbs furnish a substitute for gum tragacanth, and as such should have a commercial value, and he has reason to believe that they may have medicinal value as squills.

Chemical composition.—The sample dried at 100°C. was examined by Dragendorff's method, with the following results :—

Petroleum ether extract ..	·036	per cent
Ether extract	·028	„
Absolute alcohol extract	·152	„
Aqueous extract	77 30	„
Ash	5 69	„

The petroleum ether extract was a greasy white residue and non-crystalline. The ether extract contained no alkaloidal principle ; under the microscope a few imperfect four-side plates were visible.

The alcoholic extract from 9 grams of the anhydrous squills injected into a cat's stomach caused vomiting in 20 minutes, and the passage of a solid stool about an hour after the injection ; no blood in vomit or stool ; the cat was not otherwise affected in any way. The aqueous extract consisted chiefly of gum.

The fresh squill in slices distilled with water afforded a distillate possessing an aromatic odour, but in which no appreciable amount of oil was visible. The distillate was agitated with ether ; on spontaneous evaporation of the

ether, a minute trace of a white greasy residue was left, possessing an aromatic odour—applied to the skin, no irritation was induced We are indebted to Assistant Surgeon C. L. Bose for the above analysis, which was conducted in the Chemical Examiner's Laboratory, Calcutta. (Pharmacographia Indica, III, 477-478.)

1284. *Scilla indica, Baker*, H.F.B.I., VI., 348.

Vern :—Suphadie-khus (B.); Bhui-kándá, pahádi-kándá (H.); Nani jangli kando, laháná rán-kandá (Bomb); Shirunari-vengayam (Tam.).

Habitat :—The Deccan Peninsula and Central India, from the Concan and Nagpur southwards, especially near the sea.

A scapigerous, annual herb, with a tunicate bulb. Bulb ovoid or globose, 1-1½in diam Leaves few or many, spreading and often rooting at the tips, 3-6in by ½in., variable from oblong to lanceolate or oblanceolate, sub-acute, narrowed into a sheathing petiole, rather fleshy, waved, obtusely keeled, dull, green above, and often blotched with black, pale and glaucous beneath. Scape 2-6in., rather stout ; raceme cylindric, 30-50-fid; bracts minute Pedicels ⅛-½in., decurved Flowers purplish or greenish-white, pendulous or cernuous. Perianth segments ⅛in long, linear, acute ; filaments as long as the perianth segments ; anthers small, shortly oblong Ovary stipitate. Capsule 3-lobed, ⅛in long and broad, membranous ; cells 1-2-seeded. Seeds cuneiform or clavate.

Uses :—Moodeen Sheriff describes the bulbs as more powerful than those of *Urginea Indica*, quite equal to the officinal drug of the British Pharmacopœia. He says they are particularly efficient if gathered soon after they have flowered, a fact which may have something to do with O'Shaugnessy's low estimate of their powers, since he remarks that the bulbs he made use of "had not flowered that season." The dose is from 1 to 4 grains.

1285. *Lilium giganteum, Wall*, H.F.B.I., VI. 349.

Vern. :—Giotra (Jaunsar).

Habitat :—Temperate Himalaya, from Garhwal to Sikkim ; Khasia Hills.

Stem 6-12ft. long, tapering, hollow. Leaves 12-18in. long, broadly ovate-cordate. Flowers 5-7in. diam., drooping, fragrant; buds linear-oblong, 3-4in. long. Anthers ⅛in. long, versatile, yellow. Capsule 3in.; septa feathered. (Kanjilal).

Uses:—The leaves are employed as an external cooling application to alleviate the pains of wounds and bruises.

1286. *L. Wallichianum, Schultes fil.*, H.F.B.I., VI., 349.

Vern. :— Findora (H.).

Habitat:—Western Himalaya, Nepal and Kumaon.

Bulbous herbs; stems leafy, erect, unbranched. Bulbs of narrow, fleshy, imbricating scales, without any other coats, small, on a creeping root-stock; scales many, short, ovate, acuminate. Stem 3-6ft.; base ascending, few-fid. Leaves sessile 6-12 by ¼-¾in., lanceolate, narrowly linear, nerves 3-5 faint. Flowers sub-solitary, horizontal, sweet-scented, white or greenish-white; pedicel long; perianth 6-10in., narrowly tubular below, then infundibular, with the upper third curved; tube greenish outside; segments sub-equal, oblanceolate, 2in. broad. Stamens not diverging, much shorter than the perianth; anthers 1in., orange-yellow. Style recurved at the top; stigma conoidal, capitate, obscurely 3-lobed. Capsule 1½-2in.

Uses:—The dried bulb scales possess demulcent properties and are used like salep in pectoral complaints. (Atkinson.)

1287. *Colchicum luteum, Baker*, H.F.B.I., VI., 356.

Sans. :—Hiranya tutha. (Golden collyrium).

Vern. :—Hiran tutiya (H.).

Habitat:—Western Temperate Himalaya; Kashmir; Chamba.

Corm gibbously ovoid, coats dark-brown. Leaves few, appearing with the flowers, linear, oblong or oblanceolate, obtuse, lorate, short at the flowering time, at fruiting 6-12 by ⅛-½in.; lip rounded. Flowers 1-2 (in spring), 1-1½in. diam., when expanded golden-yellow. Tube 3-4in.; segments oblong or oblanceolate, obtuse, many nerved. Stamens shorter than the perianth; filaments very much shorter than the long,

yellow anthers. Style filiform, much longer than the perianth. Capsule 1-1½in. ; valves with long, recurved beaks.

Uses :—C. Masson, in his narrative of an excursion into the Hazarah country in 1832 (Trans.-Bombay Geograph. Soc. ii., p. 60), notices a small bulbous root, which the Afghans dug up at Bâd Assiar on the banks of the Helmund, and which appeared to be a kind of Colchicum, for the purpose of preparing Haran-tutiha, a medicine of great repute among the Afghans. He also remarks :—"It is sold in small pieces of a dark-brown colour, and resembles a dry extract." Masson travelled through a great part of Afghanistan on foot, mixing with all classes of the people, and his experience of their manners and customs is very interesting. (Pharmacogr. Indica III, 499-500).

The corms (or bulbous roots) constitute the bitter hermodactyl of the later Greeks, and are the *surinjan* of the Indian bazârs. The true Colchicum (C. autumnale) does not occur in India, but in the bazârs there are two forms sold, the bitter and the sweet. The latter is imported from Persia. European physicians in India consider the sweet root as inert, but they would seem to hold that the bitter one possesses similar properties to the true colchicum and may be substituted for it. Recently a few children were reported to have been poisoned at Kuldana in Rawalpindi through eating the seeds of this Indian colchicum. The seeds were accordingly chemically analysed at Calcutta (as also the roots), and tested physiologically. It was found that both possessed colchicine, of which the hundredth part of a grain proved fatal to cats. [Cf. Hooper, Rept. Labor. Ind Mus. (Indust. Sec), 1902-3, 28] Watt. Com. Pro., p. 398.

In the Ph. J. for April 1, 1871, pp. 784-785, Dr. M. C. Cooke gave drawings of the starch granules of the tasteless and bitter hermodactyl, but he was not acquainted with the source of the latter, since he concluded his paper by saying " what is the source of bitter hermodactyls ? "—B. D. B.

The seeds and roots contain *colchicine*.

1288. *Gloriosa superba, Linn.*, H.F.B.I., VI., 358.

Sans. :—Lângalikâ, agnisikhâ, kalikari.

Vern. :—Nát-ká-bachhnág, karihári, lánguli (H.) ; Bishalânguli, ulatchandâl, bisha (B.) ; Siric-samano (Santal) ; Mulim, kariári (Pb.) ; Rájahrar (Ajmere) ; Nâgkaria, indai (Mar.) ; Kalaipaikishangu, kârtikaikishangu (Tam.) ; Agni-shikhá, kalappagadda, adavi nâbhi, potti dumpa (Tel.) ; Ventoni mendoni, (Malay) ; Sima-don, hsee-touk (Burm.) ; Neyangalla (Sing.).

Habitat:—Throughout Tropical India.

An herbaceous, tall, branching, glabrous climber. Root-stock of arched, solid, fleshy, cylindric, white or brownish corms, 6-12in. long and 1-1½in. diam., pointed at each end, bifurcately branched (or V-shaped), producing a new joint at the end of each branch. Roots fibrous; stems 10-12ft., given off from the angle of the young corms, herbaceous, terete. Leaves sessile, 6-8in., variable in breadth; base rounded, cordate or amplexicaul; pedicels 4-6in.; lip deflexed. Flowers 3-4in. across; segments linear, lanceolate, crisply waved. Filaments 2in. long, spreading, connective of anthers, ¼in long, green. Style 2in. long. Capsule 2in., linear, oblong Flowers at first greenish, passing through yellow-orange and scarlet to crimson from base to apex.

Uses:—According to the Nighantas, the root is purgative, hot, light and pungent; it increases the secretion of bile, and is useful in leprosy, piles, colic, boils and to expel intestinal worms.

"The root is supposed by Hindu and Muhammadan physicians to have valuable medicinal properties. Dutt writes, "It constituted one of the seven minor poisons of Sanskrit writers and had for one of its synonyms '*garbhaghâtini*,' or 'the drug that causes abortion,' but I am not aware of its being used as an abortive for criminal purposes. The tuberous root, powdered and reduced to a paste, is applied to the navel, suprapubic region, and vagina, with the object of promoting labour. In retained placenta, a paste of the root is applied to the palms and soles, while powdered Nigella seeds and long pepper are given internally with wine." Early English writers on Indian botany and materia medica speak of it as a violent poison, but none furnish satisfactory details of a case in which marked ill-effects were produced by its use. It seems highly probable that these ill-effects have been greatly over-estimated, an assumption which is confirmed by experiments recently conducted by Moodeen Sheriff. In a special opinion kindly furnished to the editor he writes: "The root is not so poisonous as is generally supposed. I have taken it myself in small quantities,

gradually increasing the dose to 15 grains. There were no bad effects, but, on the contrary, my appetite improved, and I felt distinctly more active and stronger. I have been using it in my practice during the last sixteen or seventeen years, and consider it to be a pretty good tonic and stomachic. Dose from 5 to 12 grains three times daily." In Bombay, it is supposed to be an anthelmintic, and is accordingly frequently administered to cattle affected by worms. In Madras, it is believed to be specific against the bites of poisonous snakes, and the stings of scorpions, and is also used as an external application in parasitical affections of the skin. Surgeon-Major Thomson, C.I.E., has kindly furnished the following information regarding its utilisation in Madras :—

"There are two varieties of this plant. The root of one plant divides dichotomously, that of the other does not divide at all, but appears as a single piece shooting into the ground. The former is supposed by the natives to be the male plant, the latter the female. The male root is gathered during the flowering season, cut up in thin slices and soaked in butter-milk to which a little salt is added. In this composition it is soaked by night and dried by day for four or five days. It is eventually dried well and preserved. By this process, its poisonous properties are said to be removed. When so prepared, and administered by giving a piece or two internally in a case of cobra bite, it is said to be an effectual antidote in cobra poisoning. It is called in Tamil '*Katharum cheddy.*' In scorpion and centipede stings and bites, relief is obtained from the pain by applying a paste of the root rubbed up with cold water and then warming the part affected over the fire. This paste is applied also for parasitic affections of the skin."

The starch obtained from the root by washing is given internally in gonorrhœa.

Notwithstanding its characteristic appearance, the tuber is occasionally employed as an adulterant of the roots of Aconitum ferox, to which, indeed, it is believed to be closely allied in therapeutical properties.—(Watt Dic. Ec. Pro. Ind. III. 507.)

This plant is one of the nine secondary poisons mentioned by Hindu writers. * * * * Ancient Hindu writers agree in attributing violent emetic properties to the root; it is also said to cause abortion, and as such prescribed by Hindu physicians for expelling retained after-births. Dr. Dymock, in citing the researches of Warden, says that there are two resins and a bitter principle in the root. Warden names this bitter principle superbine, and considers it identical with that of Urginea Scilla, the ordinary Squill. The bitter active principle of Squill, says Dr. Lauder-Brunton, is a glucoside Scillitoxin or Scillâin The Scillitin of some authors is probably slightly impure Scillitoxin (Pharmacology, p. 962). Squill is classed by Lauder-Brunton among stimulants of the Cardiac muscle, when moderate doses are given. When, on the other hand, larger doses are given, it acts as a "Cardiac poison" (p. 276, Op. cit.) In such cases, that is to say, where the dose is large, "the stage of stimulation is followed by one of peristaltic action and final arrest in Systole." In excessive doses, "the operation of Squills," says Dr. Waring (Therapeutics, p. 489), "is that of an acro-narcotic poison, 24 grains having proved fatal. Squill is known to cause nausea; a small dose may act with extreme violence. I have already said that the plant is well-known among the Hindus as possessing emetic properties. The conjecture of Warden is, in my opinion, based on a striking similarity of the physiological effects of the two plants on the human body. (Kirtikar's Pois. Pl. of Bombay).

N. O. PONTEDERIACEÆ.

1289. *Monochoria vaginalis, Presl.*, H.F.B.I., VI., 363.

Syn.:—Pontederia vaginalis, *Linn*, Roxb. *Fl. Ind.*, II., 121.

Vern.:—Nanka (Beng.); Nirocancha (Tel.).

Habitat:—Throughout India, in fresh water ponds and marshes. From Kashmir to Assam; Travancore.

A most variable herb. Root-stock short, sub-erect or creeping, spongy. Leaves very variable, long-petioled, 2-4in., from

linear to ovate or ovate-cordate to acuminate, 7-9-veined, sometimes as broad as long. Petioles of lower leaves stout, terete; pedicels short, emerging from the channelled sheaths of the uppermost leaves. Racemes sub-sessiled, spiciform, young, globose; rhachis lengthening as the flowers expand; terminal flower the first to open. Pedicels $\frac{1}{8}$ $\frac{1}{4}$in. Perianth $\frac{1}{3}$in. across; segments unequal, 3 larger obovate, 3 smaller oblong, blue; stamens 6, inserted on the base of the perianth segment, one longish with the filaments, spurred, large; anther dark-blue, the others yellow. Capsule $\frac{2}{3}$in. long, oblong.

Use:—The root is chewed for toothache, and the bark eaten with sugar for asthma. (Atkinson)

N. O. XYRIDEÆ.

1290. *Xyris indica*, *Linn.*, H.F.B.I., VI., 364. Roxb. 60.

Sans.:—Dádamari.

Vern.:—Dàdmâri (H.); Chine ghás, debidubba (Beng.); Kotsjillettipullu, kotsjilletri (Mal.);

Habitat.—Marshy ground, in low country; Bengal; Sikkim; Assam; Khasia Hills. Salt marshes in the Southern Konkan to Ceylon.

Erect, tufted, rush-like, scapigerous, glabrous, annual herbs, 1-2ft. high. Stem short, simple. Leaves radical, as long as the scape, $\frac{1}{4}$-$\frac{1}{3}$in. broad, bifarious, loriform (thong-shaped) or ensiform, spongy, narrowed to an obtuse tip; scabe robust, grossed; angles acute; spike $\frac{1}{2}$-$1\frac{1}{4}$in, cylindric, ovoid or globose; bracts many, $\frac{1}{4}$in. diam., broader than long, orbicular or cuneately obovoid, tumid, dark red-brown, shining, very coriaceous; margins scarious; flowers $\frac{1}{2}$in. broad, yellow, lateral bracteoles dorsally winged; wing serrulate; claw of petal as long as the sepal. Petal limb orbicular, erose; stamens 3, inserted on petal; filament short, broad; anther oblong, 2 cells, obtuse above, acute at the base; staminodes 2-3-fid; arms long; stigmas truncate. (Trimen.)

Uses :—"The natives of Bengal esteem it a plant of great value, because they think it an easy, speedy and certain cure for the troublesome eruption called ringworm. (Hon'ble John Hyde, in a letter to Roxburgh.) Agardh notices its use in itch and leprosy. (Dymock.)

Chemical composition—The plant contains a red colouring matter soluble in alcohol and intensified by alkalies and having some reactions peculiar to chrysophanic acid. (Pharmacogr. Ind., III., 511.)

N. O. COMMELINACEÆ.

1291. *Commelina obliqua, Ham.*, H.F.B.I., VI., 372.

Syn. :—C. communis, *Roxb.* 57.

Sans. :—Kanchata.

Vern. :—Korna, kanjurá, kána (Hind); Játa-kanchura, játa-kansbira (B.).

Habitat :—Throughout India, from the base of the Himalaya to 6,000ft. The Western Ghats, Singapore, Ceylon.

An annual herb, 2-3ft., stout, branched, glabrous. Branches widely creeping below. Leaves very variable, 4-7 by 1-2in., sessile or petioled, lanceolate or ovate-lanceolate, finely acuminate or caudate, membranous, glabrous, scabrous or villous. Sheath ¾-1in.; mouth ciliate, with long hairs. Spathes sessile or very shortly peduncled, ¾-1in. broad and long, solitary or crowded, turbinately funnel-shaped, cuspidate, glabrous. Raceme usually simple. Flowers bright-blue, ⅔in. across, clawed. Petals orbicular, pale-blue, one of them nearly white (Collett). Ovary 3-celled. Ovule 1 in each cell. Capsule ⅓in. long obovoid or oblong, trigonous, 3-celled, 3-valved, 3-seeded. Seeds ¾in. long, oblong or ellipsoid smooth, puberulous, lead-coloured, margins often marbled. (Trimen.) (J. D. Hooker).

Uses :—The root is useful in vertigo, fevers and bilious affections, and as an antidote to snake-bites. (Atkinson.) According to Loureiro, it is refrigerant and laxative, and to be useful in strangury and costiveness.

The authors of the *Pharmacographia Indica* (III. 509), speaking of *C. Bengalensis, Linn.* write :—" This and several other species of *Commelina* are included under the Sanskrit name Kanchata * * * The stems, roots and seeds which contain much mucilage and starch are used on account of their demulcent properties.

1292. *C. suffruticosa, Blume.*, H.F.B.I., VI., 374.

Vern. :—Dare orsa (Santal).

Habitat :—Tropical India, from Nepal, Sikkim and Bengal to Central India.

An annual branching herb, usually slender and creeping below. Stems stout, branched, nearly glabrous. Leaves 3-14in. by ¾-2in., acuminate, sessile, lanceolate, scabridly pubescent; sheaths auricled. Spathes ⅓-½in. long and broad, small, shortly peduncled, broadly ovate, cordate between, cucullate and complicate, panicled or clustered, acute or obtuse, villous. Raceme simple, 6-12-fid. Petals white or blue. Seeds straw-coloured, puberulous, ellipsoid, rugose. Capsules 2-celled.

Use :—The root is applied by Santals to sores. (Campbell.)

1293. *Aneilema scapiflorum, Wight.* H.F.B.I., VI., 375.

Syn. :—Commelina scapiflora, *Roxb.* 59.

Vern. :—Siyâh mûslî (Hind.); Kureli (B.); Sis-muliá (Guj.).

Habitat :—Temperate and Tropical Himalaya, from the Upper Gangetic plain, eastwards to Bhutan, Travancore and Tenasserim.

Simple herbs. Roots of elongated tubers. Leaves all radical, 4-10in., erect, finely acuminate, narrowly ensiform. Scape erect, with narrow, strict, elongate panicle 8-18in. Bracts large, sheathing, lower ones long, upper small, amplixicaul. Flowers small. Capsule ellipsoid, trigonous, ¼in., mucronate. Seeds in a triangular column, angled, straw-coloured, with a white, minutely reticulate and glandular epidermis, 3-6—superposed in each cell. (J. D. Hooker).

Uses **:—Said to have astringent and tonic properties, and considered to be hot and dry; useful in headache, giddiness,**

fever, jaundice and deafness. It is also an antidote to poisons, and regarded as a cure for snake-bites. "Root-bark dried in the shade is said to have been employed with benefit in asthma. Also used in colic, piles and infantile convulsions. It is used for incontinence of urine. The dried powder, mixed with sugar, is used as an aphrodisiac. With the juice of the *tulsi* leaves, it is administered for pains in the kidneys, and one of the chief remedies used by the Hakims in spermatorrhœa. (Watt's Dictionary.)

1294. *Cyanotis tuberosa, Schultes.*, H.F.B.I., VI., 386.

Syn.:—Tradescantia tuberosa, *Roxb.* 280.

Habitat:—In damp sandy grounds of Ceylon, the Dekkan Peninsula; on the west side, from the Konkan to Travancore.

Stems 6in.-3ft., sub-erect or procumbent and creeping below, more or less hirsute. Roots of fleshy, cylindric fibres or tubers. Radical leaves sessile, ensiform, 6-10in. by ½-1in., often purple beneath, scaberulous. Cauline leaves narrowly oblong, distant or in distant fascicles, falcate, short, often purple beneath, linear or ensiform, villous; sheath of radical 1in. long, glabrous or of the cauline leaves, softly silky. Cymes villous or densely hirsute, ½-1in., usually peduncled in the axils of short, ovate, acute leaves, upper often corymbose, strongly falcately decurved. Bracts ovate or lanceolate, falcate, shorter than the cyme. Bracteoles ½-⅔in. (J. D. Hooker), ⅛-⅓ in. (Trimen), dimidiate-ovate or lanceolate, acute, falcate, villous or densely hirsute. Sepals ¼ by $\frac{1}{16}$in., linear, oblong, acute, villous. Corolla ⅓in. long, tube funnel-shaped; lobes rounded, short, $\frac{1}{10}$-⅛in. long, blue-purple. Filaments bearded, fusi-form towards the tips; anthers $\frac{1}{10}$in. long, yellow. Style thickened at the tip, with a tuft of hairs near the apex. Capsule ⅙ by $\frac{1}{10}$in., softly hirsute, hairy above. Seeds $\frac{1}{16}$in. long and broad, brown, conic, obscurely rugose. A most variable plant in habit, foliage and pubescence.

Use:—The root is used by the Santals in long continued fevers and also worms in cattle. (Campbell.)—Watt ii, 674.

1295. *C. axillaris, Rœm et Schultes*, H.F.B.I., VI., 388, Roxb. 280.

Syn. :—Tradescantia axillaris, *Linn.* 116.

Vern. :—Nirpulli (Tam.); Soltraj, baghanulla (H.); Itsaka (Bomb.); Golagandi (Tel.)

Habitat :—Throughout India, in the plains, from the Upper Gangetic Valley to Assam, Ceylon low country.

Annual herbs, with stems 6-18in., stout or slender, elongate, glabrous or sparsely hairy, diffusely branched, leafy. Branches sub-erect and creeping below or prostrate; internodes 1-3in.; roots fibrous. Leaves sessile, 2·6 by $\frac{1}{6}$-$\frac{1}{3}$in., narrowly linear or linear-lanceolate, acute or acuminate, flat, glabrous or hairy; sheath $\frac{1}{4}$-$\frac{1}{3}$in., mouth ciliate. Cymes reduced to axillary fascicles of flowers, with the small, linear or linear-lanceolate bracteoles, almost concealed in the leaf sheaths. Flowers bright-violet-blue. Sepal $\frac{1}{12}$in., spathulately lanceolate, acuminate, sparingly hairy. Corolla petal long-clawed; tube $\frac{1}{3}$in. long; lobes small, rounded; filaments fusiform below the tip. Style bearded, glabrous. Capsule $\frac{1}{6}$-$\frac{1}{4}$in. long, shortly stipilate, long-beaked, quite glabrous; beak half as long as the body. Seeds large, up to $\frac{1}{10}$in. long, oblong, compressed or ventrally concave, brown, shining, cancellate, with shallow pits.

Uses :—On the Malabar Coast, this is viewed as a useful remedy in tympanites (Rheede). It was one of the plants brought to Dr. Buchanan Hamilton while in Behar, as a useful medicine for external application in cases of ascites, especially when mixed with a little oil (Ainslie.)

Lyon found the seeds to have the following percentage composition:—Water 10·29, fat 0·62, albuminoids 15·99, carbohydrates 24·79, cellulose 9·36, ash 8·89. The nitrogen was estimated at 11·28 grains per oz., and the nutritive carbon at 145·80 per oz. He calculates the nutritive value of the seeds as compared with the average cereal at 100·00 to be 85·76. (Pharmacogr. Ind., III. 510.)

N. O. FLAGELLARIEÆ.

1296. *Flagellaria indica, Linn.*, H.F.B.I., VI. 391.

Habitat **:—Throughout India, chiefly near the coast, from the Sunderbuns and Chittagong to Ceylon and Singapore.**

A reed-like climber, quite glabrous, climbing over lofty trees by the leaf-tendrils; stem nearly 1in. thick towards the base, terete, smooth; branches clothed with cylindric, smooth, striate, closed, truncate sheaths; branchlets as thick as a crow-quill. Leaves sessile, 6-10in. long, variable in breadth, lanceolate from a rounded base, shortly narrowed into the sheath, drawn out at the apex into a slender spiral tendril, many-nerved; sheaths cylindric, striate, 2-auricled at the apex Flowers white, in shortly pedunculate, irregulary laxly branched panicles, 6-12-in. long. Outer perianth-segments $\frac{1}{10}$in. long, broadly ovate or suborbicular, obtuse; inner segments similar, more or less unequal. Anthers $\frac{1}{12}$in. long, deeply 2-fid at the base. Ovary to top of stigma $\frac{1}{10}$in. long; style-arms about $\frac{1}{20}$in. long. Drupe pisiform, red, smooth. (Cooke).

Use:—The leaves are said to be astringent and vulnerary. (Bailey.)

N. O. PALMEÆ.

1297. *Areca Catechu, Linn.*, H.F.B.I., VI., 405; Roxb. 665.

Sans.:—Puga-phalam; Gubâk.

Vern.:—Supári (H. & B.); Támbul (Ass); Poka-vakka, vakka (Tel); Kamugu, pákku kottai-pákku (Tam); Adike (Kan.).

Engl.—Betel-nut.

Habitat:—Cultivated in many parts of India.

Trunk solitary, 40-100 ft. Leaves 4-6ft.; leaflets numerous, 1-2ft, upper confluent, quite glabrous. Spathe glabrous, compressed. Spadix much branched; rachis stout, compressed; branches with filiform tips bearing more or less distichous, minute male flowers. Female flower solitary at the base and axils of the branches; sepals $\frac{1}{3}$in., ovate, obtuse; petals sub-similar; staminodes 6, connate. Fruit 1½-2in., smooth, orange or scarlet.*

* Mr. M. K. Venkata Rau of Bangalore, has described a variety, *Areca Catechu*, Var. *deliciosa*. He says:—"The ordinary betel-nut has a very astringent taste when tasted raw (before boiling). * * The present variety is fairly sweet to eat and is further distinguished by the fact that the endosperm is much lighter in color and softer." (Jour. Bo. N. H. S. XXIII, 793).

Uses:—Young nut possesses decided astringent properties, and is prescribed in bowel complaints and bad ulcers. It contains a large proportion of tannic and gallic acids, and hence its astringent property. The burnt nuts, when powdered, form an excellent dentifrice. According to Dr. J. Shortt, the powdered nut, in doses of 10 or 15 grains every three or four hours, is useful in checking diarrhœa arising from debility. It has also been found very useful in urinary disorders, and is reported to possess aphrodisiac properties. The dried nuts, when chewed, produce stimulant and exhilarant effects on the system.

"The powdered seeds have also long been held in some reputation as an anthelmintic for dogs, and Areca has now been introduced into the British Pharmacopœia on account of its supposed efficacy in promoting the expulsion of the tape-worm in the human subject. It is also reputed to be efficacious against round worm (Ascaris lumbricoides). Dr. Barclay, who appears to have been the first practitioner who called attention to the remedial value of the areca-nut in the expulsion of tape-worm, administered it, in powder, in doses of from four to six drachms, stirred up with milk" (Bentl & Trim. Med Pl.) Dr. Waring says: "Anthelmintic virtues have been assigned to the nut, but it can hardly have any claim to this character, as amongst the Hindus and Burmese, who use it habitually as a masticatory, intestinal worms (lumbrici) are almost universally met with."

The nut is regarded as a nervine tonic and emmenagogue, and is used as an astringent lotion for the eyes. The juice

* In a note on the subject published in the *Pharmaceutical Journal* for February 14, 1874, Mr. Charles Andrews wrote that in his experience, acquired during a residence in the Bombay Presidency, he had frequently known it to be used with very good effect as an anthelmintic. It is picked off the tree, and grated on an ordinary nutmeg grater. About a tea-spoonful is administered, after the patient has fasted twelve to fourteen hours, either made up into a bolus with ghee (clarified butter) or floating on milk, the latter being the favourite method. It generally acts (without any other medicine being given) in about an hour after administration, and is efficacious for round as well as tape worms. In his opinion it is more useful, given *grated* than in a *fine*

of the young leaves, mixed with oil, is said to be used externally in lumbago. The dry expanded petioles may be used as ready-made splints.

"Is useful in checking the pyrosis of pregnancy. 'Control experiments' made with tincture of catechu showed the superiority of the nut, and would seem to demonstrate that this is not merely due to astringent action; possibly its property as a nervine stimulant enhances its utility" (Surgeon G. King, Madras.) "Used as an astringent for bleeding gums; women employ it both internally and locally for stopping watery discharges from the vagina." (Asst. Surg. Jaswant Rai, Mooltan, in Watt's Dic.).*

"The nut has been investigated by Herr Jahns, who reports that he has separated from it three alkaloids, of which arecoline is the most important."—Ph. J., Feb 2, 1889. p 605.

"Without doubt, arecoline is the physiologically active constituent of the areca-nut, and the one on which its action against tape-worm is dependent. In the opinion of Dr. Maume, the physiological experiments indicate that the areca-nut may prove a valuable article, since there can be no doubt that arecoline hydro-bromide is capable of being utilized therapeutically on account of its effect on the peristaltic action of the bowels, and

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* Mr. John R. Jackson, A. L. S., Curator of the Museums, Kew, wrote in the *Pharmaceutical Journal* for Feby 28, 1874:—

In some parts of China the nuts, bruised and powdered, are mixed with the green food given to horses, and they are thus considered a preventive against diarrhœa. In the north of China, small pieces of the nut are boiled and the decoction is taken as a domestic remedy in various visceral affections.

Though the use of the betel as a masticatory turns the teeth black, it is said to preserve them from decay in a remarkable manner, and this may be the reason why some English chemists have introduced the pulverized charcoal into this country as a tooth powder.

In Borneo the flowers, which are fragrant, are mixed with medicines and used as charms for the cure of many diseases. In some parts of India, the juice of the young tender leaves mixed with oil is applied as an embrocation in cases of lumbago, and a decoction of the root is a reputed cure for sore lips, so that, whatever may prove to be the value of the areca-nut as an anthelmintic in this country, it is certain that the tree is much esteemed for its numerous uses in the East.

on entozoa, and also in suitable combination as a cardiac remedy."—Ph. J., Feb. 23, 1889, pp 667-668.

Areca nuts contain about 14 per cent. of fat. An elaborate analysis of the fat has been made by A. Rathje (*Archiv. de Pharmazie*, 246, 9, 1908, 703), in which it appears to resemble cocoanut oil, but the extensive use of the nuts in the East as a masticatory precludes this oil from reaching any commercial importance (Agri. Ledger, 1911-12, No. 7, p. 168)

1298. *Caryota urens, Linn.*, H.F.B.I., VI. 422; Roxb. 668.

Eng. :—Hill Palm ; Sago Palm.

Vern. :—Mari (H.); Rung-bong, simong (Lep.); Bara flawar (Ass.); Salopa (Uriya); (Duk.), Bherawa, berli, bhirli mahad, berli mád, bherlá máda, berli mhár, ardhi supári (Mar.); Bhirli-mád, birli-mhar (Bomb.); Shiwajata, shankarjatá (Guz.); Birli-mád (Konkan); Mhár mardi, mari, jirúgú, goragú (Tel.); Conda-panna, erim-panna, utalipanna (Tam.); Bhyni, beina, bagni (Kan.); Shunda pana (Mal.).

Habitat :—Throughout the northern parts of India.

Tall palms, 40-60ft. high by 1-1½ft. in dim, soboliferous or not, flowering from the upper leaf-sheaths, and successively from lower (alternately male and female); trunk naked or sheathed. Leaves few, very large, 18-20 by 10-15ft. broad, bipinnatisect; leaflets 4-8in. long, very obliquely dimidiately flabelliform, or cuneiform, præmorse or rounded at the tip, petiolules or bases swollen at the insertion. Spathes 3-5, incomplete, tubular, 1½ft. long. Spadices 10-12ft. long, interfoliar, shortly pedunculed, much fastigiately branched; branches slender, pendulous; flowers solitary and male, or 3-nate with the intermediate female. Male flowers symmetric; sepals rounded, imbricate; petals linear-oblong, valvate; stamens about 40; filaments very short, white; anthers acuminate, long. Fem. fl. subglobose, sepals 3, rounded, imbricate, rather broader than in the male; petals ⅔-¾in. in diam., rounded, valvate; ovary 3-celled, stigma 3-lobed, ovules erect. Fruit 1 or 2 globose, 1-2-seeded, stigma terminal. Seeds erect; albumen ruminate; embryo dorsal.

Uses :—"An excellent spirit is obtained by the fermentation and distillation of the toddy obtained from this elegant palm,

which is not uncommon on the west coast of the Madras Peninsula. It is well adapted for pharmaceutical purposes. A glass of the freshly-drawn toddy, taken early in the morning, acts as a laxative." (Pharm. of India.)

"The nut is used as an application to the head in cases of hemicrania, from an idea of the supposed efficiency of the half-nut in curing the affected half of the head." (S. Arjun.) The pith or farinaceous part of the trunk of old trees is considered to be almost equal to the best sago of commerce; it is baked into bread and boiled into a thick gruel.

1299. *Phœnix dactylifera, Linn.*, II.F.B.I., VI., 425, Roxb. 723.

Sans.:—Kharjura; Pinda Kharjura

Vern.:—Tree=Khajúr, khaji; fruit=khúrma, chhúhárá, kukyán, khujiyán, kujran, pindakhejúr (Hind.); tr.=Khájúr. fr. =khurmá, pindakhejúr (Beng.); Kasser (Bhot.); tr.=khajúi khají; fr.=pind, chírwaí, bagtí, khajúr, kukyán; cabbage of leaves=gadda, gallí; gum—hokmchil, gond, sher-i-darakht i-khurma (Pb.); tr.=mach, fr.—khurmâ (N. Baluch.); Kajura (Pushtu); Karmah (Turki); Pind chirdi, kurma, tár, khají; fr.=jarikha, clanuko (Sind.); tr.=khajúr, fr.—tamara, rajib, nakel, kurma, chuara (Bomb.); Khajúr (Mar.); Khajúr, kháriki* (Guz.); fr.=périch-chankay (Tam.); Khajúrapu perita; mudda kharjúrapú; fr.=karjúru-kaya (Tel.); Kharjúra (Kan.); fr.= Teních-chan-káya (Malay.).

Habitat:—Cultivated in the Punjab, Sind and Trans-Indus.

A tall palm, attaining 100-120ft., the foot often surrounded by a dense mass of root-sacks. Leaves grey, longer than those of P. sylvestris. Leaflets making a very acute angle with the common petiole. Fruit 1-3in. long; pulp substantial, very sweet. The best fruit comes from Muscat; the next best is that from Persia.

Uses:—Dates are considered demulcent, expectorant, laxative, nutrient and aphrodisiac. They are prescribed in cases

*Kharik is young *Khajur*, boiled in milk, hence its crumpled form (K.R.K).

of cough, asthma and other chest complaints ; also in fever, gonorrhœa, &c. The gum is esteemed as a useful remedy in diarrhœa and diseases of the genito-urinary system. Long continued use of the fruit is said to produce soreness of the gums. Honigberger states that the inspissated juice was, in his time, officinal in Lahore. The natives of South India make a paste of the seeds by trituration with water, and apply it over the eyelids for opacity of the cornea. The fresh juice is cooling and laxative. In the cold season, when the juice does not undergo fermentation, it is an excellent medicine.

"Date-sugar" is more nutritious and agreeable than Cane-sugar. It can be used as a substitute for maltine and its various preparations. (Dr. R. L. Dutt. in Watt's Dic).

The tree yields a gum (*hukn chil*), used medicinally in the Punjab (Watt.)

1300. *P. sylvestris, Roxb.*, H.F.B.I., VI., 425; Roxb. 723.

Sans.:—Khurjhúri, kharjuru, madhukshîr.

Vern.: -Sendhi, khajúr, khaji, thalma, (H.); Kajar, khejur (Beng); Khejuri (Ur.); Khajur (Kol.); Khijur (Santal); Sindi (Gond.); Khajúr, khaji, juice =sendhí, tári (Pb.); Sendi (Berar); Boichand, sendri, Shindi (Mar.); Karak (Guz.); Itchumpannay, peria-itcham itchamnar, (Tam.), Ita, peddaita, ita-nara, ishan-chedi (Tel.); Ichal kullu, ichalu mara (Kan.)

Habitat:—Cultivated throughout the plains of India and Burma. Wild in the Indus basin. The seeds are eaten by birds and dropped undigested with their excreta. That may partly account for so-called wild growth of this very handsome hardy palm.

An erect palm, reaching 40-50ft. high, 1-2ft. in girth. Stem thick, densely crowded with the bases of the petioles of the leaves or marked by prominent scars if the leaves have fallen. Wood light-brown, outer cylinder hard and rough ; inner soft. The crown 12-15ft. in diameter. Near the ground there is often a dense mass of rootlets, no root-suckers. Leaves 10-15ft., quite glabrous, greyish-green. Spines up to 4in. long ; leaflets 6-18

by ¾-1in.; common petiole at base ¾-1in. broad; the fascicles of leaflets up to 3in. apart. Spathe 12-14in., scurfy. Spadices erect, fruiting inclined, with spreading branches. Branches of male filiform. Male inflorescence, says Brandis, "white, scented, compact, on short peduncle." Fruiting peduncle 2-2½ft. long, 1-1½ft. wide, terminating in large branches of spikes; spathe thick, almost woody Fruit 1-1⅛in long, yellow while ripening, reddish-brown when fully ripe, then sweet pulp around the terete; stony hard seed—seed ventrally grooved—in long embryo, ventral.

Uses:—The fruit, pounded and mixed with almonds, quince seeds, pistachio nuts, spices and sugar forms a *paushtik*, or restorative remedy, much in vogue. A paste, formed of kernels and the root of the *Achryanthes aspera*, is eaten with betel leaves as a remedy for ague. (Dymock.) The juice obtained from the tree is considered a cooling beverage. The central tender part is used in gonorrhœa and gleet. The root is used in tooth-ache From the tree a gum is obtained, of which very little is known

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1301. *Nannorhops Ritchieana, H. Wendl*, H.F.B I., VI., 429.

Vern.:—Mazri, nozarai (Trans.-Indus); Kilu, kaliúm (Salt Range); Pfis, pesh, phana (Sind and Beluch), Maizurrye (Pushtu).

Habitat:—Sindh, Afghanistan, Baluchistan and the Western Punjab.

A gregarious, tufted, low-growing, glabrous palm, with prostrate branching, robust rhizomes or stems, 8-10ft. long, as thick as a man's arm, dichotomously branched, covered with the old leaf sheaths. Leaves 2-4ft. long and broad, whitish, split to the middle or lower into rigid segments, with often interposed fibres. Petiole unarmed, 6-12in.; margins serrulate. Spadix pyramidal, 2-3ft. Branches ascending and recurved. Branchlets slender. Flowers in pair within a membranous spathella, one sessile, bracteate, the other pedicelled or bracteate. Flowers polygamous, male and bisexual in a large, erect, pyramidal,

much ramified panicle, the branches in the axils of coriaceous sheaths narrowed into a lanceolate blade. Calyx and petals thinly membranous. Stamens 6, sometimes 9in. in the male flower. Stamens in the male flower inserted in the corolla-tube in the hermaphrodite flower in its throat ; anthers deeply sagittate. Ovary 3-celled, narrowed into a style. Drupe globose, ellipsoid or oblong. (Beccari and Hooker). 1-seeded, globose, $\frac{3}{4}$in. diam.

Uses :—The delicate young leaves are given in diarrhœa and dysentery. They are also purgative ; chiefly used in veterinary medicine. (Bellew.)

1302. *Borassus flabellifor, Linn.*, H.F.B.I., VI. 482 ; Roxb. 724.

Sans. :—Tála.

Vern. :—Tál, tár, (H.) ; Tâl (B.) ; Tale (Santal) ; Tâd, Dral (Guz.) ; tâda, talat-mâd (Mar.) ; Potu-tati, tâti-chettu (Tel.) ; Panaimaram panam, pampai (Tam.) ; Panâ (Mal.) ; Tâll, tâlé pané-mare (Kan.)

Habitat :—Cultivated throughout Tropical India, Bengal and southern part of the United Provinces.

Trunk attains 100ft. high and 2ft. in diam. near the ground, with a dense mass of long rootlets, often swollen above the middle, when young covered with dry leaves or the bases of petioles, when old marked with the black narrow scars of the latter. Leaves 3-5ft. in diam. ; segments 60-80, shining, folded along the midrib, linear-lanceolate ; petioles 2-4ft. long, semiterete, the margins with hard spinescent serratures. Flowers diœcious. Spadix very large, simply branched, sheathed with numerous open spathes. Male flowers small ; spikes 1-3 at the ends of the branches, cylindric, densely clothed with imbricating bracts ; numerous minute secund spikelets concealed by the bracts so as to appear immersed in the spike, the flowers coming to the surface one by one as they successively open. Stamens 6 ; filaments connate with the corolla into a stalk. Female flowers larger, globose, 1in. in diam. ; perianth fleshy, greatly accrescent. Sepals imbricate. Petals smaller, convolute. Staminodes 6-9.

Ovary 3-4-celled. Fruit a large subglobose brown drupe, 6in. in diam. or more, with 1-3 obcordate fibrous pyrenes, enclosed by the enlarged perianth. Seeds oblong, 3-lobed at the top; albumen uniform, hollow. (Cooke).

Uses:—The juice of this plant is used as a stimulant and antiphlegmatic. The *ash* of the dry spadix is used as an *antacid* in heartburn. The saccharine juice, when freshly drawn, is exceedingly sweet, and, if taken regularly for several mornings in succession, acts as a laxative. The light-brown, cotton-like substance from the outside of the base of the fronds, is employed by the Cinghalese doctors as a styptic to arrest hæmorrhage from superficial wounds. The fresh juice is also useful in inflammatory affections and dropsy. Vinegar, toddy and a spirituous liquor are made from this tree. The juice slightly fermented is used in diabetes. The ash of the spadix is given internally in bilious affections. This ash is also used in preparing dyes.

The ash acts as a powerful blister and applied on enlarged liver and spleen in combination with some other demulcents. The pulp of the ripe fruit is applied externally in skin diseases. Palm sugar is antibilious and alterative and used in hepatic disorders and gleet. The juice is diuretic and prescribed in chronic gonorrhæa (T. N. Mukherje). "The root is cooling and restorative. The ashes of the flowering stalk said to be useful in enlarged spleen." (U. C. Dutt.)

"A useful stimulating application, called toddy poultice, is prepared by adding fresh-drawn toddy to rice-flour till it has the consistence of soft poultice, and, this being subjected to a gentle fire, fermentation takes place. This, spread on a cloth and applied to the affected part, acts as a valuable stimulant application to gangrenous ulcerations, carbuncles and indolent ulcers." (Ph. Ind.)

The expressed juice of the leaf-stalk and young root is used in cases of gastric catarrh and to check hiccup. The fermented juice sometimes acts as a drastic purgative. An extract of the green leaves is used internally in secondary syphilis. The ash of dry spadix is largely used as an antiperiodic; it is feebly so. (Watt's Dict.).

Revd. Father J. E. Blatter, S. J. Professor of Botany, St. Xavier's College, Bombay, in his account of this palm in the Journal of the Bombay Natural History Society, Vol. XXI, has reprinted an English translation of a Tamil poem, entitled "Tâla Vilasum," written by "Arunachalam, a poet of Terruk-Kudantei, the same with Combaconam in the province of Tanjore." This poem enumerates no less than 801 different purposes to which the Palmyra may be applied. The extracts given below show some of its uses in medicine :

Griping of the bowels, diarrhœa and lodging of small fish bones in the œsophagus may be removed by eating dried Palmyra pulp.

If the flour of the dried edible Palmyra-root (Odial) be mixed with Cocoanut milk, salt water and fish, and if the paste be steamed, the cake when eaten will daily add strength to any body. The middle pieces of the Odial are cleared of their outer fibrous skin, soaked in water, then dried and powdered; if the flour be mixed with the cocoanut milk, salt water, fish and herbs, and if the paste be steamed and then ghee be added to it, the cake will indeed be very sweet; if certain fruits and pungent substances be added to the above, the cake will be of an agreeable taste If the Odial flour be mixed with the scrapings of the kernel of the cocoanut and powdered rice, cummin, pepper and chilly ; if the paste be steamed and the cake be broken and dried, it can be preserved for two months. No other cakes will resemble the above. Sweets are more agreeable to cakes of the above description. If curds, milk, ghee, and cocoanut milk be added to the paste of the Odial flour, and be steamed, the cake, when used, has the power of retinendi seminis virilis in corpore sine pollutione, conferendique facultatem horas in thalamo jugali protrahere, and increasing muscular strength ; the person will not be reduced by labour.

Toddy if taken daily, will increase one's muscular strength and give a gloss to his person ; if used by children in small quantity it will remove itch and many other diseases If powdered load-stone and scoria of iron and file be put into the pot that is attached to the incised blossom, and the toddy collected in such a pot be drunk for seven days in the morning.

If shell-lime be put in the pot that should be attached to the blossom, and the toddy be used, hunger, thirst, languor and laziness will be removed, heat in the constitution will be destroyed and coolness be created. Toddy will be very sweet if powdered pepper be put in it and boiled. If toddy be boiled nicely, and if slices of ash-coloured pumpkin be boiled in it.

1303. *Cocos nucifera, Linn.*, H.F.B.I., VI., 482 ; Roxb. 664.

Eng. :—The Coco-nut Palm.

Sans :—Nârikela, nari-kera, nari-keli, langalin.

Vern. :—Nâriyal (H.); Nârikel, dâb (B.); Narel, nariyéla (Guz.); Narela, narulâ, mâd, mahad (Mar.); Tenna, tenga (Tam.); Narikadanu, tenkâia, kobbari, erra-bondala, gujju-narekadam (Tel.); Thenpinna, kinghenna, tengina (Kan.); Tenga, kalapa, nyor kalambir (Malâ.); Nur (Mysore).

Habitat :—Cultivated in India, Burma, Ceylon. Indigenous in the Cocos Island and North Andamans. (Kurz.)

Mr. O. F. Cook, in his paper on the Origin and Distribution of the Cocoa Palm, published in Vol. VII of Contributions from the National Herbarium, United States of America, brings forward evidence for the American origin of the cocoanut palm. In another paper on the History of the Cocoanut palm in America, published in Vol. 14 of the abovenamed Contributions, he brings additional facts to show that the cocoanut palm was already widely distributed in the New World before the arrival of the Europeans, and that it is not naturally a maritime or humid tropical species, but a native of drier and more temperate plateau regions in South America. (B. D B.)

An unarmed, erect, tall, handsome, monœcious palm, the greatest beauty of the sea-coast of the Western Peninsula down to Ceylon; not found wild. Trunk 40-80ft., 1-2ft, diam., thickened and ascending at base, inclined black, scarcely forked. Leaves 12-18ft.; leaflets 2-3ft., linear, lanceolate, acuminate, flaccid, bright-green. Petiole 3-5ft., stout, unarmed. Spadix 4-6ft., straw coloured, simply branched, shortly stoutly pedunculed; branches flexuous, densely fascicled. Spathe 2-3ft., narrowly oblong, tapering at both ends, glabrous or downy, spilling longitudinally. Male flowers small, yellowish; sepals $\frac{1}{12}$in., ovate, acute; petals $\frac{1}{4}$in., oblong-lanceolate; filaments subulate, anthers linear, erect. Female flowers:—few bibracteolate; Sepals about 1in., concave; petals rather smaller. Ovary tented on an orange coloured disk. Fruit trigonously obovoid, oblong or sub-globose, 6-10in. long. Endosperm forming a thick white layer of a fleshy fibrous substance adherent to the membranous testa, which again is adherent to the almost stony-black endocarp. The embryo is opposite one pore only. This is the most noticeable character of the fruit. The coir is from the dense fibres beneath the exocarp.

Uses:—"The root is used as diuretic as also in uterine diseases. The ashes of the leaves are used in medicines. The fluid deposited in the interior of the cup is rubefacient and is an effectual domestic remedy for ringworm. (U. C. Dutt). The green fruit is given as a refrigerant, the flowers as an astringent, and the oil employed as a substitute for codliver oil. The milk of the nut, the juice from the flowering spikes, and the tomentum from the leaves are all used medicinally.

Water from the Green Nut. –"The water of the unripe fruit is described as a fine-flavoured, cooling, refrigerant drink, useful in thirst, fever and urinary disorders." (U. C. Dutt.) "It may be drunk to almost any quantity without injury and is considered by the native doctors as a purifier of the blood." (Ainslie.) It is commonly believed in Bengal, however, that too much cocoa-nut milk induces a hydrocele swelling of the scrotum.

The Edible Pulp and the Milk prepared therefrom.—The pulp of the young fruit is nourishing, cooling and diuretic. The pulp of the ripe fruit is hard and indigestible, but is used for medicinal purposes. Ainslie says: "By scraping down the ripe kernel of the cocoa-nut and adding a little water to it, a white fluid is obtained by pressure, which very much resembles the milk in taste and may be used as a substitute for it."

"Dr. Shortt reports having sucessfully employed the fresh milk.—*i.e.*, the expressed juice of the grated kernel--in debility, incipient phthisis, and cachetic affections, in doses of from 4 to 8 ounces twice or thrice daily. It has a pleasant taste, and may be used as an excellent substitute for cow's milk in coffee; it may thus be advantageously administered even to children. In large doses, it proves aperient, and in some cases actively purgative; hence it is suggested by Mr. Wood as a substitute for castor oil and other nauseous purgatives." (*Pharm. Ind. 247.*)

The following is a prescription known in Hindu medicine as *Narikela-khanda*: "Take of the pounded pulp of cocoa-nut half a seer, fry it in 8 *tolas* of clarified butter, and afterwards boil in 4 seers of cocoa-nut water till reduced to a syrupy consistence. Now add coriander, pepper, bamboo manna, cumin

seeds, nigella seeds, cardamoms, cinnamon, *tejapatra*, the tubers of Cyperus rotundus (*mustaka*) and the flowers of Mesua ferrea (*nâga kesara*) 1 *tola* each, in fine powder, and prepare a confection. Dose 2 to 4 *tolas* in dyspepsia and consumption." (U. C. Dutt, *Hindu Mat. Med.* 248.)

The Shell :—"The cleared shell of the nut or portions of it are burnt in a fire, and, while red hot, covered by a stone cup. The fluid, which is deposited in the interior of the cup, is rubefacient, and is an effectual domestic remedy for ringworm." (U. C. Dutt, p. 248.) The *Bombay Gazetteer of the Thana District* alludes to this in the following words: "The shell, when burnt, yields an oil which is used as a cure for ringworm." "In the Antilles, the cocoa-nut is the popular remedy for tapeworm, and its efficacy has been conclusively demonstrated by medical men in Senegal. A cocoa-nut is opened and the almond extracted and scraped Three hours after its administration a dose of castor oil is given. The worm is expelled in two hours afterwards. In nine cases in which this remedy was tried by a surgeon in Senegal, the result was complete —*Natal Mercury*." (*Trop. Agri.*, 1882-83.)

In the Thana district, three oils are prepared from the edible portion or kernel of the nut. These are known as *khobrel*, *avel* and *muthel*. A fourth oil is, however, repeatedly alluded to, namely, an oil prepared from the shell of the nut (*see above*). This last-mentioned oil is perfectly distinct from the oil of the kernel, and is used only in the treatment of ringworm. Its chemical properties have never apparently been determined, nor does it seem to have before this been pointedly made known to European medical authorities as a substance actually prepared and employed by the Indian doctors. It is remarkable that the same properties should be assigned to the shell by the inhabitants of other parts of the world besides India, although they do not apparently distil the oil from it. But of the kernel oils used medicinally, the most conflicting statements have been published both as to their action and mode of preparation. Thus: "A very cheap, hard, white soap is prepared from the oil, suitable for pharmaceutical purposes, such as plaster-making

and the preparation of soap liniment" (Dymock). The *Pharmacopœia*, on the other hand, says this oil is inferior to ground-nut oil and sesamum oil as a vehicle for liniments. Sakharam Arjun remarks: "The fresh oil is prepared for medicinal purposes by boiling the milk of the ripe cocoanut. It is used as an application for burns and in baldness." Ainslie observes it is obtained by boiling the bruised kernels in water, or "on other occasions it is obtained by expression." Drury says: "The oil used internally for medicinal purposes is not the common commercial oil in its crude state, but the oleine obtained by pressure refined by being treated with alkalies, and then repeatedly washed and distilled with water." The therapeutic properties of the oil are discussed in the *United States Dispensatory*. "In Germany it has been used in pharmacy, to a considerable extent, as a substitute for lard, to which, according to Pettenkofer, it is preferable on account of its less tendency to rancidity, its more ready absorption when rubbed on the surface of the body, and its less liability to produce chemical changes in the substance with which it is associated. Thus the ointment of iodine of potassium, when made with lard, becomes yellow in a few days, while if made with cocoanut oil it remains unchanged for two months or more. Vegetable substances also keep better in ointment prepared with this oil than with lard. Besides, it takes up one-third more water, which is a useful quality when it is desirable to apply saline solutions externally." 'A preparation has been shown to us, said to be the liquid part of cocoanut oil, prepared in London, and, under the name of *coco-olein*, used, instead of the oil itself, as a substitute for cod-liver oil. The dose of this, as well as of the oil, is half a fluid ounce three times a day."

The various processes adopted in India for preparing oil from the cocoanut result in the formation of substances that are reputed to possess widely different properties. This fact might almost be supposed to be in consequence of chemically different oils being isolated. Dr. Dymock says of the so-called *muthel* oil: "In the Konkan the oil which separates from the freshly-rasped kernel, alone or mixed with tamarind-seed oil,

is used under the name of *mutel* as an application to burns and rheumatic swellings; sometimes black-pepper is added to it." In the *Thana Gazetteer* a somewhat different process of preparing *mutel* (?*muthel*) oil is given "To make *muthel*, dried kernels are cut into thick pieces and boiled in water. The pieces are then crushed in water and the whole boiled again over a slow fire, when the oil rises to the surface and is skimmed off."

Cocoanut oil is said to promote the growth of hair; "hence it is much used as a local application in alopecia and in loss of hair after fevers and debilitating diseases" "The oil is given in plethora and as a vermifuge in Jamaica It is given while fasting, warmed and with a little sugar, in flux An emulsion of the oil and kernel is prescribed in coughs and pulmonary diseases generally. Pound the kernel with water, place it to settle, and skim off the cream This is preferable to the expressed oil."

"Cocoa-nut oil was proposed by the late Dr. Theophilus Thompson (Proceed of Royal Society, 1854, Pt. III., p. 41) as a substitute for cod-liver oil, and in this character it has been favourably noticed by Dr. J H. Warren (Boston Med. and Surg Journ., Vol. III, p 377) and others The substance used in these cases was not the ordinary commercial oil, but the oleine obtained by pressure from the crude oil (in the solid state it is met with in England), refined by being treated with alkalies, and then repeatedly washed with distilled water. In his Lettsomian Lectures, Dr. Thompson gives the result of his treatment with this agent in 53 cases of phthisis. Of the first 30, 19 were much benefited, in 5 the disease remained stationary, and in the remaining 6 the disease continued to advance. Of the second 23, 15 were materially benefited, 3 remaining stationary, and 5 became worse. Dr. Garrod (Brit. and For. Med. Chir. Rev., Jan., 1856) has shown that it exercises a marked influence, almost equal to cod-liver oil, in increasing the weight of the body. The great advantage of its employment experienced by Dr Thompson, Dr. Garrod, and also by the Editor, who instituted some trials with it, is, that under its

prolonged use it is apt to induce disturbance of the digestive organs and diarrhœa. Its use is favourably noticed in the Report of Drs. Van Someren and Oswald, and Mr. J. Wood." (Pharm. of India.)

Dr. Dymock says cocoa-nut oil has been tried in Europe as a substitute for cod-liver oil, "but its indigestibility is a great drawback to its general use." Drury observes: "its prolonged use, however, is attended with disadvantage, inasmuch as it is apt to disturb the digestive organs and induce diarrhœa." May it not be that the unfavourable opinions formed by some writers regarding this medicinal oil proceed from the fact that nearly every author describes a different mode of preparing it and, consequently, that it is possible many different substances or a substance in many stages of purity or impurity may have been experimented with? In the Maldives, cocoanut oil is esteemed a powerful antidote against the bite of poisonous reptiles.

The Juice —The freshly-drawn milk from the young spadix is refrigerant and diuretic, a preparation known as toddy poultice. The fermented juice constitutes one of the spirituous liquors described by the ancient writers. "A tumblerful of the fresh juice is sometimes taken early in the morning on account of its refrigerant and slightly aperient properties." (Dymock.)

Scrapings of the husk –"The outside scrapings of the husk and branches applied to ulcers will cleanse and heal them rapidly if soaked in proof rum; the efficacy of this application was proved by the case of two bad ulcers occasioned by the bite of a Negro's teeth. The young roots boiled with ginger and salt are efficacious in fevers, the same as the bamboo." (Royle.)

The cotton or Tomentum.—"This is a soft, downy, light-brown-coloured substance, found on the outside of the lower part of the branches of the cocoanut tree, where they spring from the stem, and are partially covered with what is called pandáy, or coarse vegetable matting of the tree. The cocoanut cotton is used by the Indians for stopping blood, in cases of wounds, bruises, leech-bites, &c., for which purposes it is

admirably fitted by peculiar texture." (Ainslie, Mat. Ind.) Compare with tomentum of Caryota urens (and of Borassus).

The flowers—Are sometimes used medicinally, being said to be astringent.

Immature nuts.—These, like the flowers, are often employed medicinally, especially as an astringent in the sore-throats of children.

The root.—"The root is used as a diuretic, as also in uterine diseases." (U C. Dutt, 248.) It is also employed as an astringent gargle in sore-throat.

The ashes.—"The ashes of the leaves contain an amount of potash; they are used medicinally."

The bud.—The tender buds of this palm, as also of Borassus and Phœnix, are esteemed as a nourishing, strengthening, and agreeable vegetable

"The cocoanut milk of the green fruit is a cooling, refrigerant drink, containing albumen and salines. It is a good drink in cholera cases. It succeeds in checking vomiting when other means fail. Cocoanut oil, prepared from fresh pulp, is a good substitute for cod-liver oil. The dose I give is from 20 to 30 minims in the beginning, rising to a drachm thrice daily. An ash is prepared from cocoanut pulp by the Kabirajes which is a valuable antacid and digestive. It is called '*Narkel khond.*' A sweet extract is also prepared, which is used for similar purposes" (R. L. Dutt, M. D., Pubna). "The sweet toddy obtained from this palm is very refreshing and possesses laxative properties. Its continued use (twice or thrice weekly) during pregnancy has a marked effect on the colour of the infant, which is born of a fair complexion,—*i e.*, if of dark parents, comparatively fair; if of lighter-coloured parents, the offspring generally assumes a European complexion" (Hon. Surg. P. Kinsley, Chicacole, Ganjam). "If the flowers are mixed with sugar, the root of *khus-khus*, and white *chandan*, with a little water, the combination will be found good in bilious fever, will check vomiting, and produce a cooling sensation." (Civil Surgeon William Wilson, Bogra.)

Prof. Pariso, of Athens, records the discovery, by accident, of the tænicidal property of the cocoanut, while he was resident in Abyssinia. On returning to Athens he made a number of observations, which, he says, were most satisfactory, the tæniæ being always passed and quite dead. (Lancet, Aug 18, 1889, p. 341). "When properly prepared and intelligently administered, says a correspondent of the *Times of India*, the cocoanut is equally efficacious with male fern oil, Kousso, pomegranate root or turpentine, whilst it is as pleasant to the palate as they are offensive." (Ph J Nov. 3, 1888, p 346.)

Crude cocoanut oil owes its peculiar odour to the presence of a small amount of an essential oil. The principal constituents of this oil are methylheptyl and methylnonyl ketones. A small amount of an alhedyde is also present. The oil therefore resembles oil of rue (*Ruta graveleous*). Under the action of hydrogen at 250°-300°C. in the presence of nickel, methylnocyl ketone yields a hydro-carbon, $C_9 H_2O$, and a penacoline $C_{22} H_{44} O$. The hydrocarbon boils at 150°-155°C. at 760 mm. The pinacoline melts at 27°C, and gives an oxime boiling at 233°-137°C, at 15 mm. and a semi-carbazone, m. pt. 225°-227°C. [A Haller and A. Lassieur Comptes rend. 1910, abstracted in J. Ch. I., 15th June 1910, p. 704]

The use of freshly dried kernels ensures the production of an oil containing little acidity.

Cocoanut oil is a light coloured oil, with a bland taste and a peculiar but not unpleasant odour. In the winter months when the temperature falls to 22° to 24° it solidifies to a white fat. The oil may be easily purified and in this state it forms a favourite edible oil. Cocoanut oil is used in enormous quantities in the manufacture of soaps, made by the boiling process, as also by the cold process; the crystalline character of the fat renders it suitable for toilet preparations. The oil is employed extensively as a vegetable butter and as a chocolate fat. Cocoanut oil resembles palm oil in its chemical composition; like the latter it contains large proportions of trimyristin and trilaurin, smaller quantities of the palmitin, tristearin, and triolein, as also the glycerides of the volatile acids caproic, caprylic and capric. It is practically free from hydroxy acids (Lewkowitsch), and free from butyric acid.

Crossley and Le Sueur (1898) obtained the following constants in oil received from Malabar, Bengal and Bombay: Specific gravity at 100°, 0·903 to 0·904; acid value, 0·9 to 35·2; saponification value, 255·5 to 258·2; iodine value, 8·25 to 8·54; Reichert Meissl value, 6·65 to 6 79; melting point, 23·5 to 25·0; insoluble fatty acids, 82·35 per cent.

Cocoanut oil is rarely adulterated with other fats, and the above tests are usually sufficient for its recognition. (Agric. Ledger, 1911-12—No. 5, pp. 167-168).

N. O. PANDANEÆ.

1304. *Pandanus fascicutaris, Lam.* H.F.B.I., VI. 485.

Syn :—Pandanus odoratissimus, *willd* Roxb 707.

Sans. :—Ketaka ; Ketaki.

Vern. :—Keorâ ; ketgi ; gagandhul (H.) ; Keyâ ; ketuki (B.) ; Kenda (Bomb.) ; Keodá (Mar) ; Kewoda (Guz.) ; Talum ; tazhai ; thalay (Tam.) ; Mugali, Gâangi, ketaki (Tel.).

Habitat .—Sea coast of the Peninsula, on both sides, Burma, Ceylon seacoast, Andaman and Coco Islands Common on the sea shore. Gamble says that native women (India) " wear the panicles in their hair " They wear the white bracts also which are more fragrant, I may add. (K. R Kirtikar)

Dicœcious, gregarious, perennials, much branched. Stem bent, sometimes up to 25ft. high, but more often shrubby, resting on strong aerial roots. Leaves bright or dull-green, but seldom glaucous, 3-5ft. long, caudate, acuminate, always with slightly curved strong spines on edges and mid-rib. Male plant throws out at the end of the branch a spadix with numerous sessile cylindric spikes, 2-3in. long, enclosed by white, fragrant, caudate, acuminate spathes, staminal column ¼-½in. long, anthers cuspidate inserted along the whole length of the upper portion (Brandis). The female plant bears no male floral organs. Female spadix solitary, 2in diam., enclosed in spathiform yellow bracts like those of the male inflorescence, but stricter. Carpels confluent in obpyramidal groups of 6-10 or fewer, green. stigmas short, reniform, yellow ; fruit an oblong or globose orange or scarlet, syncarp 6-10in. long and broad, carpels 2-3in. long, turbinate, angular, confluent, crown smooth, convex, more or less depressed round the reniform stigmas (Trimen).

Uses :—The oil and otto, obtained from the bracts ; are considered stimulant and anti-spasmodic and are administered for headache and rheumatism. A medicinal oil is prepared from the roots. The aerial root is used medicinally by the Sinhalese.

N. O. TYPHACEÆ.

1305 *Typha elephantina, Roxb.* H.F.B.I., VI., 489; Roxb. 648.

Syn :—Typha angustifolia, Linn.

Sans :—Eraka.

Vern :—Pater Râmabâna, (H.); Hoglâ (B.); Bora (Kumaon); Kûndar, dib, dab, pitz, yira, boj, lûkh, patira gond, pan, borî (Pb.); Pitz, yira (Kash.); Pun, pollen = bûr, bûrî (Sind); Râmbâna (Mar.); Ghabajarin (Guz.); Jammu gaddi, emigajunum (Tel.).

Habitat :—Marshes from N.-W. India to Assam and southward, very common in Bombay marshes along the B B. & C. I. Railway, between Mahim and Dadar In the Thana District abundant at Bhiwandi and in Banganga River on the way to Chinchan Tarapur. (K. R. Kirtikar.)

Annual marsh herbs. Stems 6-12ft. Leaves erect spongy, 1-1½in. broad, trigonous above the sheath, margins often undulate above the middle. Flowers bracteolate. Male spike 8-12in. rachis clothed with short, often forked hairs, bracts 3 or more, anthers, 1·5, $\frac{1}{10}$in. long. Pollen 4-globate. Female spike much shorter 6·10 by ½-1in. diam. Flowers mixed with clarate pistillodes, bracteoles with fasciate tips much longer than the hairs, which are shorter than the stigmas. Stigmas lanceolate (J. D. H.)

Uses :—The down of the ripe fruit is used as an application to wounds and ulcers, which acts in the same way as the medicated cotton wool.

"The root-stock, which abounds in starch is somewhat astringent and diuretic, and is employed in Eastern Asia in dysentery, gonorrhœa and measles." (Mr. Maiden in Ph. J., 1st Sep., 1888, p. 180.)

N. O. AROIDEÆ.

1306. *Cryptocoryne spiralis, Fisch.* H.F.B.I., VI. 494.

Syn. :—Ambrosinia spiralis, *Roxb*, 623.

Vern :—Nattu-ati-vadayam (Tam.); Natti-ati-vasa Tel.).

Habitat :—Bengal, Deccan Peninsula.

A small grass-like herb growing on the margins of ditche and ponds, submerged during the rainy season only. Root-stcel tuberous, soboliferous; roots vermiform. Leaves 3-8 by $\frac{1}{3}$-$\frac{2}{3}$ in. linear-lanceolate, acute or acuminate, narrowed from the middl to both ends; nerves nearly parallel; petiole short, stout. Spath subsessile, 3-5in. long; tube very short, much shorter thar the limb, linear-lanceolate, at first twisted, greenish outside dark-purple and transversely lamellate within. Ovaries 5 6; stigmas broadly elliptic. (Cooke).

Uses :—The Ati-vadayam of the Tamils is the Atis of Northern India, and is the tuber of Aconitum heterophyllum. The country Atis of the Madras Presidency has for a long time been undetermined, until in 1888 Mr. M A Lawson was able to refer it to Cryptocoryne spiralis and a species of Lagenandra. Moodeen Sheriff says the root bears a strong resemblance externally to Ipecacuanha, and he has used it as a tonic and anti-periodic with children It attracted attention a few years ago through several packages of it appearing in the London market as "False Ipecacuanha" It is a well-known drug in Ceylon, where it is employed by the native doctors in decoctions, in combination with other drugs as a remedy for infantile vomiting and cough, and in the case of adults for abdominal complaints and fever (Dymock).

1307. *Pistia stratiotes*, *Linn.* H.F.B.I., VI 497, Roxb. 502.

Vern. :—Jal-kumbhi, tâkâpânâ (H. and B.); Banjhánjhe (Uriya); Prashni, gondâla (Mar); Kodda-pail (Mal.). Anterghunga (Dec.); Agasatmary (Tam.); Anterei-tamara (Tel.)

Eng. :—The Wester-lettuce.

Habitat :—Throughout India, in still sweet water.

A floating, gregarious, stemless, stoloniferous herb. Roots of tufted simple white fibres clothed with fibrillæ. Leaves 1$\frac{1}{2}$-4in. long in Indian forms, apex rounded or retuse, undulate, pubescent above and beneath; nerves raised beneath, flabelliform,

converging within the margin. Spathe white, obliquely campanulate, ½in. long, alternately gibbous or tubular and closed below, contracted about the middle, dilated and nearly circular above, tubular below Spadix adnate to the back of the tube of the spathe, free above Male inflorescence of few sessile connate. Stamens beneath the apex of spadix, slits vertical, with a ring or confluent minute neuters below them. Female inflorescence a solitary conico-ovoid, 1-celled ovary Style conical, stigma discoid; ovules many, or thotropous, basal or subparietal. Fruit membranous, few-seeded. Seeds oblong or obovoid, albuminous, testa at length rugose; embryo minute, apical, cuneiform.

The leaves are connected together into a rose-shaped tuft, and these send out runners bearing other plants in all stages of growth.

The flowers, or inflorescence, are nestled at the base of the leaf, and it may easily be seen there, by some of the young unfolded leaves, that the spathe which encloses the flowers is nothing but a modified leaf, the lower sides involute, and bearing the stamens and pistil.

The roots descend loose into the water, with no necessary attachment to soil or mud, and are long and feathery.

In tropical countries it is most abundant in all the ponds of water preserved for public use, and keeps the water always fresh and cool, which would be greatly subject to putrefaction and charged with a multitude of insects, had they continued exposed to the heat of the sun The plant, however, is there considered acrid, and when the droughts set in and the waters are reduced very low, they are overheated and so impregnated with the particles of this vegetable, that they occasion bloody fluxes to such as are obliged to use them at those seasons. (Curtis' Botanical Magazine for February 1st, 1851.)

Uses:—The plant is cooling and demulcent, and is given in dysuria. The leaves are made into poultices and applied to hæmorrhoids. Mixed with rice and cocoanut milk they are given in dysentery, and with rose-water and sugar in cough and asthma. The root is laxative and emollient. (Rheede; Ainslie; Voight.)

Captain W. O. Swanston, in a letter dated Camp at Tanjore, 2nd July, 1863, to the Assistant Inspector-General, Madras Police, wrote that the plant destroyed most effectually the bugs that invested the Tanjore jail.

"The plant is just put down close to the walls in the floor, and its smell apparently has the effect of enticing the bug to it,

and then of throwing the bug into a state of torpor from which nothing will arouse it. In two or three nights, the jail has been completely cleared of bugs."

The ashes are applied to ringworm of the scalp, and in some parts of India are known as *pânâ* salt. (Watt.)

1308. *Arisæma speciosum, Mart.*, H.F.B.I., VI. 500.

Syn. :—Arum speciosum, *Wall.*

Vern. :—Samp-ki-khumb ; kiri-ki-kukri, kiralu (Pb.).

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

Root-stock oblique or shortly creeping and rooting ; often 5in. diam. Petiole very stout, green, smooth, often marbled with brown or purple. Leaf solitary. Leaflets all petiolulate acuminate lateral, dimidiate cordate, median ovate, cuneate or rounded at the base, 16-19in , edged with red or purple. Petiolule ½-2in.; nerves broadly reticulate. Peduncle much shorter than the petiole. Limb of spathe 2-6in. long banded white and purple ; ovate-lanceolate, incurved, caudate, acuminate ; tube of spathe 2-4in., striped with purple, spadix pink or yellowish tail, 12-18in., dark-purple Base of appendage not often inflated, usually ovoid, not truncate or disciform. Appendage cylindric or fusiform narrowed into a very long filiform tail. Anther cells 4-5. Ovaries ovoid. Stigma sessile, pulvinate. Very variable in size and colouring.

Uses :—In Hazâra, the root is stated to be poisonous ; in Chumba, it is applied pounded to snake-bites. In Kûlû, where the tuber is given to sheep for colic, the fruit is said to have deleterious effects on the mouth when eaten by children. (Stewart.)

1309. *A. tortuosum, Schott.* H.F.B.I., VI. 502.

Syn. :—A. curvatum, *Kunth.* Roxb. 628.

Vern :—Bir-banka (Nepal) ; Gurin, dor, kirkichâlu, kirakal, jangush (Pb.).

Habitat :—Temperate and subtemperate Himalaya, from Simla

to Bhutan. The Khasia Hills, Manipore; the Western Ghats. from the Konkan to Malabar.

Tuberous herbs. Tubers spheroidal, attaining 5in. diam. Petiole 1-3ft., green or with the sheaths mottled with purple. Leaves 2-3. Leaflets 8-18in., distant or crowded or almost radiately disposed, sessile or petiolulate ovate-or linear-lanceolate, subcaudately acuminate. Peduncle 2-4ft. Spathe 4-6in., pale-green or purplish, tube subcylindric, tapering, gradually dilating into the limb. The limb incurved broadly cymbiform, acuminate. Spadix uni-or bisexual; appendage like a rat's tail quite smooth, narrowed from the base to the tip erect. Ovary ovoid, attenuated into a short style Berry 4-5-seeded. A very variable plant.

Collett describes the following two species separately as included by Hooker under A. tortuosum. *Schott*—as growing at Simla—(1) A curvatum, *Kunth*:—Male and female flowers on different or on the same plants Anthers blue or purple. (2) A. helleborifolium. *Schott*—Male and female flowers on the same plant, but in very unequal numbers. Anthers white or yellow.

Uses:—It is stated to have poisonous qualities. In Kûlû, the seeds are said to be given with salt for colic in sheep. The root is used to kill the worms *which infest cattle* in the rains. (Stewart.)

1310. *A. Leschenaultii, Blume.* H F.B.I., VI. 504.

Vern:—Wal-kidâran (Singh).

Habitat.—Western Ghats, from the Konkan southward. Ceylon.

Monœcious or dioecious Tuber large, globose 2in. diam. Stem 6in stout, clothed with long mottled sheaths Leaf solitary, pedatipartite Leaflets 5-11-whorled, sub-sessile, lanceolate, serrulate, caudate acuminate, dark-green above, with a stout mid-rib, pale beneath, base acuminate. Petiole stout; 1ft. long, pale-green, irregularly barred or mottled with pale-purple. Spathe emerging from the sheath of the petiole, very shortly peduncled, 6-18in. long, dark-green, externally striped with

pale-green or dull-purple, very dark-green within, tube as long as the limb, narrow, ribbed, erect, gradually dilated into the slightly decurved ovate-lanceolate, acuminate, cymbiform limb which terminates in a filiform clavellate tip, sometimes 3in. long. Spadix up to 3in. long, gradually passing into a very narrowly clavate, pale-green, smooth appendage, longer than the inflorescene, with a rounded, sometimes verruculose top. Anthers 3-4-nate, sessile, with a few subulate neuters above them. Ovaries very many, minute, densely crowded. Colour of spathe very variable (Trimen)

Uses :—The roots are employed as a medicine by the Singhalese. (Thwaites.)

1311. *Sauromatum guttatum, Schott.* H.F.B.I., VI 508.

Syn. .—Arum sessiliflorum *Roxb.* 628

Vern. :—Loth (Bombay, according to Dymock); Bhasamkand (C. P.).

Habitat :—The Punjab; Upper Gangetic Plain and the Himalayas, from Nepal to Simla ascending to 5,000 feet Found in the Konkan, abundant in Thana. (K. R K.)

Root tuberous, large, globose. Stem spotted with purple, sheathed at base by membranous spotted scales. Leaf solitary, appearing after the flower stalk, radical, pedately compound. Stalk 12-18in, spotted Leaflets 9-11, oblong lanceolate, unequal, more or less sessiled at base, very variable in size and shape, the central one 6-13 by 1½-4in, outer ones gradually smaller. Spathe 12-24in green-purple outside, tube 3-4in, cylindric or globosed, inflated, margins united, the inner surface speckled purple on yellow ground, the base deeply purple. Limb lanceolate, narrowed into a long linear curved tip, the inside irregularly blotched with purple and white, the margins purple. Spadix prolonged into a tapering, dark-purple appendage, 6-10in. long. Male and Female flowers on the same plant. Female flowers crowded round the base of the spadix, with a few club-shaped neutral organs above them. Ovary obovate; ovules 1-2. Male flowers crowded in a ring 2-3in. above the

female. Berries scarlet, 1-seeded, in a globose head, more or less enveloped in the withered base of the spathe. Flowers when mature smell of carrion. (Collett.) Of late years the tubers have been sold by most of the bulb growers in England under the name of "Monarch of the East." They are advertised to grow in a warm room, "without water or soil." (B D.B.)

Uses:—The tubers, which are like small potatoes, are used as a stimulating poultice; they are very acrid" (Dymock.)

1312. *Typhonium trilobatum. Schott*, H.F.B.I., VI. 509. *Arum orixense of Roxb.*

Syn.—Typhonium orixense, *Schott*. Arum orixense, *Roxb.* 627.

Vern.—Ghit-kochu (Beng.); Karunaik-kizhangu (Tam.); Kanda gadda (Tel.); Chena (Mal.)

Habitat:—Lower Bengal, Burma, the Eastern and Western Peninsula. Ceylon, where it is common in damp places, in moist low country. Often a troublesome weed in cultivated ground, says Trimen

Tuberous monœcious herb, Stem 0 Tuber sub-globose, about 1in. diam Leaves long petioled, hastately 3-lobed, with a truncate or cordate or 2-lobed base, the lobes broad or narrow, sinus sometimes very deep and narrow, or 3-partite, with segments 5-7in long, the central broadly ovate, acuminate, lateral smaller Petiole 6-12in. Spathe 3-8in Peduncle 1-4in, tube oblong or pyriform, much shorter than the broadly ovate, caudate acuminate, expanded limb, which is dull red-purple within, paler externally, with undefined green stripes; spadix 2-4in, sessile, erect, male inflorescence cylindric, female very short, surmounted by a dense mass of filiform tortuous neuters, ½in. long, interspace between the neuters and male inflorescence naked; appendage shortly stipitate, slender, striate, acute or obtuse, red, base truncate; anthers minute; ovaries crowded in a hemispheric mass, stigma pulvinate. (Trimen.)

Uses:—The roots are exceedingly acrid, and used in poultices; and also applied externally to the bite of venomous