

NOTES ON THE GENUS CLERODENDRUM (VERBENACEAE). XXIII

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CLERODENDRUM Burm.

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CLERODENDRUM INDICUM (L.) Kuntze

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A virgate, soft-wooded, unarmed, very handsome and ornamental shrub or low treelet, to 3 m. tall, suffrutescent undershrub, or even a perennial herb, basally shrubby and stoloniferous, of rapid growth, gregarious; stems annual, usually very straight or arching, wand-like, mostly unbranched, fluted, hollow; branches, when present, very stout, hollow, obtusely tetragonal, the larger ones 8--10-sulcate, subglabrate; bark smooth, shiny, greenish or ashy-gray; blaze greenish; nodes (except the younger ones) annulate, occasionally marked with a band of pubescence; principal internodes mostly elongate, 2.5--10 cm. long; leaves approximate, opposite, or verticillate in whorls of 3--6, sessile or subsessile, oleander-like; petioles (when present) stout, 3--8 mm. long, glabrous, often striate; leaf-blades membranous or thinly chartaceous, soft when fresh, mostly very fragile when dry, linear-lanceolate or oblong to narrowly elliptic, varying to oblanceolate, 7.5--23 cm. long, 0.7--5.5 cm. wide, apically mostly acute or acuminate, sometimes subobtuse, marginally entire and recurved, basally gradually attenuate to acute, glabrous on both surfaces, sparsely punctate beneath; midrib stout, very prominent beneath; secondaries slender, 7--10 per side, short, arcuate-ascending, prominulous beneath, arcuately joined a few mm. from the margins; vein and veinlet reticulation very sparse, obscure above, not at all prominulous beneath; inflorescence axillary and terminal, abundant, the axillary cymes opposite and solitary or whorled, usually supra-axillary, 4--6 cm. long, 3--7-flowered, lax, widely divaricate; terminal panicle thyrsoid, 45--60 cm. long, 15--25 cm. wide, very showy, usually much elongate and lax, composed of 3--12 whorls of trichotomous cymes, glabrous throughout, often more or less continuous with the many axillary cymes borne in the upper leaf-axils; peduncles and sympodia similar to the stems or branches in size, shape, texture, color, and glabrescence, but slightly more slender; bracts foliaceous, resembling the leaves in all respects but smaller, usually numerous, caducous; bractlets broadly linear, very numerous, reddish when young, 5--15 mm. long, 2--3 mm. wide, glabrous; prophylla linear, 1--6 mm. long; pedicels 0.5--2 cm. long, glabrous; calyx green or finally red, very broadly campanulate, thick-textured, glabrous or subglabrous, its tube 5--7 mm. long, the rim deeply 5-lobed to or below the middle, the lobes subcoriaceous, wide-spreading, ovate, 6--10 mm. long, basally 4--9 mm. wide, apically acute or subacute; corolla hypocrateriform or infundibular, mostly white or whitish to yellowish-white or cream-color, varying to pinkish-white or yellow, very showy, not fragrant, opening at night and closing in the next forenoon, its tube very long and slender, 7.5--15 cm. long, glabrous or patently glandular-hairy, curvate, the limb 1.5--2.5 cm. wide, the lobes oblong or ovate-oblong to obovate, 8--15 mm. long, apically obtuse, eventually strongly reflexed; stamens 4, inserted at the mouth of the corolla-tube, long-exserted, "projecting in a double curve for some time after the flower first expands, afterwards they become revolute" (fide Roxb.);

filaments slender, curvate, red to purple or brown, glabrous; anthers oblong, 2.5--3 mm. long, purple or black, "incumbent, &c. according to the position of the filaments" (fide Roxb.), the thecae parallel; pollen ochre-yellow, prolate, 115 μ x 84 μ , the ectine surface spinulate, the apocolpium diameter 70 μ , the exine thickness 6.2 μ ; style long, slender, purple, "longer than the stamens, at first projecting, or recurved, after impregnation ascending, when the stamens become revolute" (fide Roxb.); stigma bilobed, the lobes short, rather thick, apically acute; ovary obtuse, 4-lobed, externally glabrous; fruiting-calyx accrescent, fleshy, bright-red, crimson, or scarlet to brown-red or purple, to 3 cm. in diameter; fruit drupaceous, green and shiny or blue-green when immature, becoming deep-violet, blue-black, or reddish-black to black when ripe, subglobose, 1--1.3 cm. long and wide, normally 4-sulcate and 4-lobed (or 1--3-lobed by abortion), the fleshy exocarp mostly deep-lavender to dark-blue, rugose, fetid; pyrenes 1--4, mostly only 1 or 2 developed, 1-seeded, rounded except for a slight flattening on the inner surface, about 1 cm. long and 8 mm. wide, gibbous and rugose or concave to angular, smooth, the endocarp coriaceous-crustaceous; seeds basally attached, 1 per cell, at first green, later rufescent, the integument simple, membranous, thin, the embryo conforming to the seed in size and shape, erect, white; cotyledons obovate, fleshy, thick, plano-convex; radicle short, conic, inferior; chromosome number: $n = 15$; $2n = 30, 40, 48, \text{ or } 52$.

This species is native from Pakistan, India, and Nepal eastward to Burma, Thailand, Malaya, Indochina, and Indonesia, north to southern China, and is widely cultivated in warm countries of both hemispheres; naturalized in the Hawaiian Islands, New Caledonia, the Samoan and Society Islands, and from the southern United States, through the West Indies, to the Guianas. Nomenclaturally it is based on Amman, *Stirp. Rar. Imp. Ruth.* pl. 15 (1739). Savage (1945) has verified that there was no specimen of this species in the Linnean Herbarium (now in London) at Linnaeus' first and second enumerations, but specimens 807/1 and 807/2 were there in his third enumeration. The name, therefore, cannot have been based by Linnaeus on actual specimens but actually on the Amman plate. I examined and photographed both the Linnean specimens and the Amman plate, the photographs being cited below in the present work.

The plant is slightly bitter and astringent, containing an alkaloid. In Asia it is sometimes used as a substitute for opium, often gathered and smoked with tobacco. It yields a resin employed in Burma in the treatment of syphilitic rheumatism. In India the leaves are often eaten raw as a vegetable, being somewhat fleshy when fresh, while the juice from the vegetative parts is used with ghee [a kind of liquid butter made from the milk of cows and buffaloes and clarified by boiling] in the treatment of skin diseases like herpetic eruptions and pemphigus. The resin is used as an insect repellent in preserving clothes. The pounded root is said to be useful (when taken with ginger) in treating asthma, coughs, and other pulmonary complaints, as well as to combat blood diseases, tumors, burning sensations, and scrofulous affections. Smoke produced by burning the dried leaves is also said to cure coughs. In

Java it is the pounded leaves that are dried and smoked in treating asthma. In India the plant is used in the form of a ghee, powders, or enemas in treating abdominal tumors; also in the same country as a tonic and against puerperal fever, atrophy, emaciation, cachery, gravel, excessive thirst, cholera, blindness, consumption, dry coughs, and bronchitis. In some localities pieces of the wood are made into necklaces and worn around the neck as a charm against various ailments. In New Caledonia the leaves are used both as a general tonic and as a vermifuge.

Boorsma (1902) tells us that "Omtrent deze plant deelt Koorders.. mede, dat de bladeren op Java in gedroogden staat wel als opiums-surrogaat gerookt worden. Door Greshoff werden vroeger....de bladeren reeds met negatief resultaat op eenig werkzaam beginset onderzocht. Het decoct van 1 gram gedroogt blad, bij een Cavia ingespoten, veroorzaakte geenerlei intoxicatie-verschijnselen. Een onbeduidende hoeveelheid alkaloid bleek in de bladeren voorhanden. De alkaloid-opbrengst uit 5 gram bladpoeder, bij een kikker onder de huid geïnjicieerd, bewerkte geen vergoftiging. Ook andere toxische bestondeelen werden niet aangetroffen. Daar geen enkel toxisch beginsel voorhanden bleek, is het nauwelijks aan te nemen, dat het rooken van deze bladeren eenig, met de opiumnarkose obereenkomend effect zou teweegbrengen."

According to Burkill (1966) "*Clerodendrons* are, par excellence, plants of Malay magic" and *C. indicum* "is the chief magical species of northern India." According to Sastri (1950) many of the Indian vernacular names applied to this species are also applied to *C. serratum* (L.) Moon "and it is likely that the two species are used indiscriminately in indigenous medicine."

Blatter and his associates (1935) assert categorically that "The [medicinal] properties are the same as those of *C. serratum*" adding that "The root is considered useful in asthma, cough and scrofulous affections. The wood is slightly bitter and astringent." They give its natural distribution as "Deccan and Carnatic, W. coast districts of Madras Presidency, Kumaon, from Sikkim and Assam to Tenasserim. -- Sumatra."

The leaves of *Clerodendrum indicum* are often attacked by the leaf-spotting fungus, *Cercoseptoria clerodendri* Pargi & Singh in northern India and by the larvae of the moth, *Diacrisia obliqua* Walker. The fungus makes circular to subcircular lesions 0.5--4 mm. wide with depressed tan centers and slightly raised reddish-brown margins, resulting in severe leaf-spotting which later spreads to the petioles and tender stems. The infection often leads to dwarfing and defoliation of the host plants.

Stewart (1972) records *C. indicum* as cultivated in gardens on the plains of Pakistan, while Jafri & Khafoor, in a personal communication to me, assert that in that country it is "A favourite ornamental of our gardens. [The] Root is used in chest troubles, and the juice [of the] leaves mixed with butter fat is applied to cure herpetic eruptions etc." They cite unnumbered Saida and Stewart collections.

Sen & Naskar (1965) report it cultivated in India; in Orissa it is said by Panigrahi and his associates (1969) to be "occasional on

moist banks". Srinivasan & Agarwal (1963) list it as cultivated in southeastern India; Patil (1963) found it growing in hedges in the Lucknow area; Vajravelu and his associates (1968) report it "common" in Kerala, citing *Vajravelu 19145*. In Delhi, according to Maheshwari (1963), it is "Common in the fruit orchards as a shrubby undergrowth", citing *Maheshwari 766*. In Uttar Pradesh it is said by Panigrahi & Saran (1967) to be "scarce", citing their *no. 1559*; in Madhya Pradesh it is recorded by Tiwari (1968) and by Subramanyan & Henry (1966), the latter citing their *no. 8697*. Banerjee (1968) and Gain & Tarafder (1971) found it in Bihar. Haines (1910) describes the plant from along riverbanks and in moist localities in general "probably in all districts" of Chota Nagpur, where it is said to blossom from May to August and to be in fruit from August to November.

Babu (1977) describes *Clerodendrum indicum* as "common in forest clearings and sal forests" at Dehra Dun, where it blooms from April to June and fruits from September to November -- he cites *Babu 33357*. Bose (1965) reports the species "very common in partial shade and cultivated in gardens" in Bengal, where Prain (1903) asserts that it occurs "in all the provinces". Voigt (1848) lists it as cultivated in the Calcutta suburbs. Dymock (1884) tells us that it is "common in Bombay gardens, and is said to grow wild on the hills east of Ahmednagar". Watt (1889) accredits it to Kumaon, Bengal, and South India, but "it is also common in gardens in Ceylon, where it is not indigenous". Thwaites (1839) and Thwaites & Hooker (1861) also claim it to be common in gardens but not native in Sri Lanka. Willis (1911), however, describes it as both wild and cultivated in Sri Lanka and MacMillan (1943) claims that it is native to both India and Sri Lanka. Freeman & Williams (1928) refer to it as an "East Indian shrub".

Collett & Hemsley (1890) give the species' distribution as "Kumaon eastward to Assam and Tenasserim; also in the mountains of South India and Sumatra". Rao & Rabha (1966) list it from Assam, while Kanjilal and his associates (1939) claim that it is common throughout Assam, where it flowers from October to May and fruits from December to August.

Roxburgh (1832) claims that the species is "Found wild from Orissa northward; where it grows to be a tall, straight shrub. [The] Flowering time [is] the hot season, and again in October; the seed ripens in the cool season." Brandis (1906) reports the plant "Common in many parts of India and Burma. Savannahs in the Duays. Sundrihan. Often as an escape from cultivation." Parker (1924) gives its distribution as "Sub-himalayan tract [in the Punjab] from the Beas eastward. Has been collected in the lower hills of the Hoshiarpur District. Frequently cultivated in gardens", flowering in July and August.

Osmaston (1927) lists the species from the subhimalayan tract of Kumaon to 3000 feet elevation "and [it] has also been recorded by Mr. H. G. Champion from the Ranikhet Division. Apparently not common", flowering there in July and August, and fruiting from September to November. Chopra and his associates (1956) describe it from

the Deccan and Carnatic, the west costal districts of Madras, Kumaon, and from Sikkim and Assam to Tenasserim [Burma]. Yamazaki (1966) gives its distribution as the Himalaya Mountains, India, Burma, Malaya, Indochina, and southern China; Badhwar & Fernandez (1968) give it as "Himalayas from Kumaon to Sikkim and in Assam up to an altitude of 1,200 , (4,000 ft.). Found in many other parts of India." Amaratunga refers to it as "a roadside weed" in Sri Lanka.

Nath (1960) records the species from the Southern Shan States of Burma; Winit found it in cultivation in Thailand; Ridley (1911) lists it from India, Thailand, the Malayan islands, the east coast of Pahang, Singapore, and Perak, while the Baileys (1976) imply that it is only originally native to the Malay Archipelago. Maximowicz (1886) ascribes it to tropical India and Java, citing an unnumbered Vachell collection from southern China. Fernandez-Villar (1880) records it, probably cultivated, from Panay in the Philippine Islands. Vatke (1882) lists it as subspontaneous in garden hedges on Nosy-bé island, off the coast of Madagascar; Bojer (1837) found it in cultivation in Mauritius, flowering there in April and May, giving its original native land as "Inde orientale, Java". In Java Backer & Bakhuizen (1965) describe it as "not rarely cultivated and locally.. naturalized, sometimes copiously in grassy, sunny or slightly shaded localities in settled areas".

In the Samoan Islands *C. indicum* is reported by Christophersen (1935) from along roadsides on Totuila, citing Garber 942. Fosberg and his associates (1979) found it on Guam.

In the New World *Clerodendrum indicum* is widely distributed. Radford and his associates (1964) report it as rare in sandy soil, waste ground, and woodlands in Charleston, Georgetown, and Jasper Counties, South Carolina; in Georgia Duncan found it abundantly established around long-abandoned house-sites on Sapelo Island, while Wood (1877) records that Dr. G. M. Green found it naturalized in fields and on waysides at Macon.

Farther south, Clewell (1985) reports the species both cultivated and escaped in Leon and Wakulla Counties, Florida; Lakela and her associates (1976) found it cultivated, escaped, and established in coastal Florida, where it blooms all through the year; Phillips (1949) also lists it as cultivated in that state. Sargent encountered "dense stands" along damp roadsides in Hardee County; Beal reported it "escaping" on Merritt Island in 1927 and Cuthbert reports it "an abundant escape" at Bradenton "and becoming a weed in cultivated ground, especially in groves". Wunderlin (1982) regards the species as native to the "East Indies" and reports it occasionally escaped from cultivation in disturbed sites in scattered localities in central Florida.

Tracy reports the species "rather common" in Florida and along the Gulf Coast of the U.S.A. to Alabama; Dr. D. Dale Thomas, in a personal communication to me, reports it in low waste ground in East Baton Rouge, Jefferson, Plaquemines, St. James, St. Mary, and Terrebonne Parishes, Louisiana. Ewan says that he found it "persisting after cultivation" in the same state, "locally frequent in old vacant

lots, evidently all escaped and thoroughly naturalized from oldtime plantings". Langlois also speaks of it in Louisiana as "quite a weed around dwellings"; Attabhanyo found it "associated with *Jasminum masonii*" there. Pratt speaks of it there as a "rare large shrub along roadsides in marshy areas" and collected pollen samples preserved as slide 475 in the Palynological Laboratory of Louisiana State University.

The pollen of *Clerodendrum indicum* is described in detail by Nair & Rehman (1962), based on U. P. NBG.16696, slide 2658. Pollen from Irwin 1088 is preserved in the Palynological Collection at the University of Texas.

In the West Indies this species is also widely distributed. Gooding and his associates (1965) found it "occasional on roadsides and in waste places" on Barbados, citing *Herb. Barb. Mus.* 578 and *Herb. Univ. W. Ind.* 261. Duss describes it as very straight in growth and unbranched, spreading by stolons, on Martinique, citing *Duss* 1220; on the island of Guadeloupe he reports it as inhabiting fields, savannas, and grassy places in general up to 300 m. elevation; Fosberg (1976) reports it on St. Croix and on Dominica it is said to be a "common weed" in banana and coconut groves. The Smiths report that on St. Vincent it is "pretty common locally in thickets and open fields not far from the sea". Broadway encountered it "wild in damp and wet lands" on Tobago and it occurs in meadows on Trinidad.

In South America it grows along canals near the seacoast in Guyana, where Irwin met with it in wet reddish sand on riversides; in French Guiana it has been found "on low swamp lands", while Lasser and his associates (1974) report it in gardens in Venezuela.

Sweet (1826) asserts that, as *C. verticillatum*, it was introduced into English gardens in 1813 from Nepal, while Loudon (1830) claims that, as *C. siphonanthus*, it was introduced as early as 1796 from the "E. Indies".

Recent collectors report finding *C. indicum* growing in moist waste places and waste ground in general, on the banks of irrigation ditches, in deep low woods, in marshes, and on grasslands, on cleared and vacant lots, in dry sandy fields, the edges of fields and forests, the margins of rice paddies, on coastal plains and stream-banks, in roadside thickets, in rocky woods, and in wet hammock soil, from sealevel to 1200 m. altitude, flowering and fruiting in every month of the year. Suwal (1969) asserts "Flowering in June"; Deb (1968) reports that in Tripura (India) it flowers and fruits from December to July; Datta & Majumdar (1966) say that in Bengal it flowers from April to June, while Cooke (1906) found that in Bombay its normal flowering period is September and October. In the Himalayas Badhwar & Fernandez (1968) report it flowering from June to August. Sedgwick tells us that in Bombay it grows in a region of 80 inches annual rainfall, while Bell found it, also in the Bombay area, where the rainfall was 120 inches per year. Bor & Raizada (1954) assert that, in general, in India it flowers in the rainy season and fruits in the cold season. They state that the "shrub... grows 4--8 feet tall in Dehra, with a slender upright form which

makes it attractive when grown against a wall. The long white tubular flowers hanging bell-like from an upright stalk make this a very striking plant during the rains. The flowers are followed by conspicuous dark-blue fruits supported by the persistent spreading red calyx. The plant prefers partial shade and is propagated by seed."

Junell (1934) illustrates a cross-section of the ovary, noting that "Von dem Fruchtblattmitten werden Ausbauchungen gebildet. Die Fruchtblattränder sind verhältnissmäßig dünn und mit leitendem Gewebe versehen. Keine Furchen dringen in die Plazenten ein."

Gaertner (1788) comments that the "Ovulorum numerus quaternarius, uti naturalis, ita quoque constantissimus est. *Valdia* Plumieri, diversissimi generis planta est, si recte se habet genericus character, quem ei tribuit Adansonus." He describes the fruit as: "PER. Bacca succulenta, calycis laciniis acute triangulis contexta, subglobosa, unilocularis, tetrapyrena, per maturitatem exarescens, quadripartibilis. Cuticula matura subspongiosa, rugosa, dorso pyrenarum adnata. Pyrenae regulariter quatuor, sed plerumque duae tantum adolescentes, coriaceo-crustaceae, hinc gibbae, rugosae, inde concavae aut angulatae, uniloculares. REC. nullum; semina basi affixa. SEM. in singulo loculo unicum, eidemque conforme, rufescens. INT. simplex, membranaceum, tenue. ALB. nullum. EMB. femini conformis, erectus, albus. Cotyl. obovatae, carnosae, crassae, plano-convexae. Rad. conica, brevis, infera."

The absence of stone-cells in this plant is noted and discussed by Malaviya (1963). Gibbs (1974) reports leucoanthocyanin and cyanogenesis absent from the leaves and syringin absent from the stems; negative results were obtained with the Ehrlich test. Chopra and his associates (1969) found the bark to contain hexitol (D-mannitol) along with sorbitol. Prakesh & Garg (1969) obtained (24S)-ethylcholesta-5, 22,25-triene-3-ol and beta-sitosterol from the stems. Tiwari & Garg (1961) found 7.8 percent hexitols present in the bark -- supposedly the first record of this substance in the *Verbenaceae*.

Sobti & Singh (1961), as well as Cave (1961), give the diploid chromosome count as 48, based on material collected in Jammu; Raman & Kesavan (1963) and Baquar (1967) give it as $2n = 30$; Sharma & Mukhopadhyay (1963) found $2n = 52$ and 46 "some with secondary constrictions"; Cave (1964) gives the number as haploid 15, diploid 52.

The corollas of *Clerodendrum indicum* are described as "white" on Balakrishnan NBK.939, Geesink & al. 6462, Irwin 1088 & R.125, Khalil s.n., Pratt s.n., Qureshi s.n., Setchell 241, Sinclair 5284, and Wilbur & al. 8082, "creamy-white" on Kalloo B.666, "off-white" on Amaratunga 1751, "greenish-white" on Amaratunga 1628 and Collector undetermined s.n., "cream" on Chand 2467, Kingdon-Ward 18856, Koelz 21564, Moldenke & al. 28219, Poore 1366, Rogers 7043-C, and Thorne 1288, "pale-cream" on Herb. Brit. Guian. For. Dept. 7101, and "yellow" on Duncan 20667.

Vernacular and common names reported for the species are numerous: "agniya", "akalbih", "akilbih", "agniya", "angiya", "angiyah", "arnah", "arni", "arní", "balaya", "baloya", "bamanhatti", "bamunhati", "bamun hatta", "bámun-háti", "bamúnhatti", "bamunhatti", "baranai", "barangi", "bead-flower", "beng son", "bhai", "bharangi", "bháragi", "bhargi", "bhárgi", "bhat", "bidoejoek",

"brahmanpatta", "brahman-patta", "brahmi", "brahmune", "brahmuni", "brahmunuyushtika", "bramanayashtika", "brama yashtika", "brahmunu yashtiki", "cháng guān jià mò lì", "chingari", "chiruteka", "chokphutra", "clérodendre à fleurs à long tube", "clérodendrum à longues fl[eurs]", "daoen ampioen", "daoen apioen", "daoen opium", "daun apium", "dawa-i-mubarak", "dawaimu-barik", "daw-ai-mubarik", "four-leaved clerodendrum", "gandja", "ganja", "ganja-ganja", "gëndjè", "gendjè", "godong apioen", "gunja-gunja", "hanjika", "hanmathucho", "hemla", "herbe a long cou", "hunjika", "ikhlalbir", "India glorybower", "Indian glorybower", "Indische hennep", "jure", "kavalai", "kembang boegang", "lèng son", "long-flowered clerodendrum", "memadatan", "memadatan", "naijemphati", "naijamphá ti", "narivalai", "ná yam pá tu", "nhayanpadu", "penatoh", "pénatoh", "pinyin", "ronggo dipo", "sarum cutur", "sarumentur", "sékár petak", "siphonante des Indes", "siphonanthus", "skyrocket", "sky-rocket", "tarlong-pi-thepo", "tow yai-mon", "tubeflower", "tube flower", "tube-flower", "Turk's head", "Turk's-head", "Turk's turban", "Turk's-turban", "Turk's-turben", "Turk's-turbine", "whorl-leaved clerodendrum", and "zonggo-dipo".

In regard to the economic uses of *C. indicum*, Dymock and his associates (1893) report that it is "stated by M. C. Dutt to be in use in Bengal as Bhángi, but the samples of that drug which we obtained from Calcutta and Cawnpore proved to be the stems and roots of *C. serratum*". Deb (1968) still says that the roots and leaves of *C. indicum* are used in native medicine in Tripura, India. Roxburgh (1832) says that "in some parts of Burma the stems are so long that they are used as rafters in cottages and various other uses". Balfour (1885) states that the species "Grows in both Peninsulas of India, in Bengal and Sylhet. Its roots and leaves are official; the Persian name [dwai-i-mubarak] means the blessed medicine. It is slightly bitter and astringent; yields resin. Employed in syphilitic rheumatism."

Watt (1889) says that "A confection called Bhángíguda is prepared [from *C. indicum*] with a decoction of their root and the ten drugs called dasamula, chebulic myrobalan, treacle, and the usual aromatic substances. It is used in asthma. An oil, prepared with a decoction and paste of the root in the usual proportions, is recommended for external application in the marasmus of children."

Burkill (1966) says that it is "A tall-herb, common in India, Indo-China, and southwards into the Malay Peninsula, where it is rare or absent in the south; then it reappears in Java, where it is not uncommon in gardens. It does not seem to have any uses in the [Malay] Peninsula, but in Java it is looked upon as a substitute for Indian hemp, and takes its names. It is smoked; but Boorsma...tried the dried leaves in a tobacco-pipe without finding that they had the slightest effect upon him. Ridley writes as if it may be smoked in the Peninsula, but that it is, is not clearly demonstrated by him."

Vidal tells us that *C. indicum* is used medicinally in Laos. Duke & Ayensu (1985) aver that in China the root is used in the treatment of asthma, cough, and scrofula. In New Caledonia, according to Rageau (1957), this plant "est amer, tonique, peut-être vermifuge. On utilise les feuilles. Dans l'Inde, la plante est réputée répul-

sive pour les insectes et sert à en préserver les vêtements". J. W. Moore reports its use in medicine in the Society Islands, and López-Palacios (1984) reports its use against asthma in Venezuela. Subramanian and his associates (1973) report the presence of a sterol, (24S)-ethylcholesta-5, 22, 25-triene-3-beta-ol, in the leaves, based on their voucher no. 14/72 in the Jipmer herbarium at Pondicherry.

Regarding the cultivation of *Clerodendrum indicum*, Woodrow (1910) tells us to "use a rich garden soil with occasional irrigation". Wurzlöw asserts that the plant "will take care of itself provided it is not exposed to too much cold." Firminger (1918) says that in India it "blossoms in May, with a great profusion of white tubular flowers, three or four inches long, when the plant, with its long strap-like leaves, has a very chaste, handsome appearance".

It may be mentioned here that the *Duthie s.n.* [Mustafabad, 11-6-98] collection, cited below, exhibits very short and extremely narrow leaves, and may well represent the form of the species described by Willdenow as *Siphonanthus angustifolia*. It may be worthy of separate form designation.

It is worth recording that Balakrishnan carefully tells us that the calyx was "green" on his no. 939, but was "pink" on no. 940.

Among numerous errors in the literature of this species may be mentioned the following: In Burman's work (1768) figure "2" on plate 41 is said in the text to represent "*Vites* [sic] *pinnata*" [= *Aglaia odorata* Lour. in the *Meliaceae*], but the figure "2" was placed by the engraver under the righthand portion of the illustration of *Ovieda mitis* [= *Clerodendrum indicum*] while the illustration of *Aglaia odorata* is left unnumbered. Both Burman and Poiret (1819) misrepresent the corolla-limb in their illustration of *Ovieda mitis* as 3-lobed.

Howes (1974) says that the name, "Turk's turban", is applied to "*Clerodendrum* spp.", but, actually, as far as I am aware, it is actually applied only to *C. indicum*. Roxburgh (1832), Watt (1889), Prain (1963), and many other botanists refer to the fruits of this plant as "berries", but, of course, they actually are drupes. Durand & Jackson (1901) mis-cite the Kuntze (1891) reference as page "586" instead of 506 and this mistake has been widely copied by later authors like Alston (1931), Maheshwari (1963), and Varma (1981). The Steudel (1840) reference is often mis-cited as "1841", the titlepage date; similarly, the Hooker & Arnott reference to *C. indicum* is often cited as published in "1841", while actually pages 193--288 were issued in 1836. Willdenow's comments on this plant are often cited as published in "1797", but, actually, part 2 of volume 1, in which they occur, was not published until 1798.

Jackson (1894) credits *Ovieda inermis* to Burman f., Fl. Indica, page 136, plate 43, figure 1, but the plant is named *Ovieda mitis* there; he also mis-cites *O. mitis* L. to page "888" in Linnaeus' Species Plantarum instead of to page 889. The name, *Ovieda mitis* Burm. seems to begin with Scopoli's Introd. Hist. Nat. 171 (1777) rather than in Burm. f., Fl. Indica, pl. 43, fig. 1 & 2 (1768) where the binomial is plainly accredited to Linnaeus.

Persaud and his associates describe *Clerodendrum indicum* as an

"annual, 3--4 ft. tall" -- actually, only the stems are annual, the plant itself is a perennial. Kingdon-Ward speaks of "racemes 20 in. long", but the inflorescences are more accurately described as cymes and cymose panicles, certainly not racemes. *Franc 1284*, in the University of California herbarium, bears a label reading "Plants of Yunnan, China" and giving E. E. Maire as the collector -- obviously a case of labels mixed during the mounting process.

It is worth repeating here Blume's description of what he called *C. fortunatum*. It reads as follows: "*CLERODENDRUM FORTUNATUM*, Linn. *C. foliis verticillatis ternis quaternisve lineari-lanceolatis integerrimis glabris, fasciculis pedunculatis axillaribus (calix campanulato-5-fidus, ad basin purpurascens; flores pallide flavi, tubo longissimo). Crescit: circa Linga Jattio ad rivulos spontaneum; in hortis saepe cultum. Floret: omni tempore. Nomen: Jure.*" The plant here described is obviously not *C. fortunatum*, but *C. indicum* instead. The homonyms of *C. fortunatum* referred to in the synonymy (above) are disposed of now as follows: *C. fortunatum* credited to Blanco is a synonym of *C. minahassae* var. *brevitubulosum* H. J. Lam, while that accredited to Buchanan-Hamilton, to Linnaeus, and to Wallich is the true *C. fortunatum* L.; *C. fortunatum* Burm. is *C. serratum* (L.) Moon and the *C. fortunatum* Sessé & Mociño is *C. ligustrinum* (Jacq.) R. Br. Similarly, the *Clerodendrum angustifolium* Salisb., referred to in the same synonymy (above) is a synonym of *C. fortunatum* L., while *C. angustifolium* (Poir.) Spreng., is a valid species (which see, 57: 482--484). The *Ovieda inermis* credited to "(L. f.) Baill." and to Retzius are *Clerodendrum inerme* (L.) Gaertn.

Alston in Trimen, *Handb. Fl. Ceyl.* 6: 233 (1931) says that a "*Clerodendron mite* Vahl" is NOT a synonym of *C. indicum*. I can find no such binomial accredited to Vahl anywhere else in literature. There is a *Clerodendron mite* accredited to Vatke in the *Index Kewensis*, but that IS a synonym of *Clerodendrum indicum*. It is cited to *Linnaea* 43: 537 (1880-82) from "Afr. trop."

Hartwell (1971) cites "Charaka-Samhita, vol. 1--2. 1888--1909. Calcutta, Corinthian Press, 1718 pp. (transl. by A. C. Kaviratna)" and "Hoernle, A. F. R. 1893--1912. The Bower manuscript. Calcutta, Sup't. Gov't. Printing. 401 pp." As yet I have been unable to verify these references.

It is perhaps also worth noting here that the Willis (1911) work listed in the bibliography of *C. indicum* (above) is credited to both J. C. and M. Willis on the cover of the work, but only to J. C. Willis on the actual titlepage.

Linnaeus (1763) described his *Ovieda mitis* from Java as follows: "*Ovieda foliis lanceolatis subrepandis*". His original description of *Siphonanthus indica* (1753) is "Folia altera, lanceolata; Pedunculi saepe e regione oppositi folii, umbellati. Amm. ruth. 1739, p. 214 t. 15. Bontius, Hist. Nat. Med. Ind. Orient. 159. 1658."

The unnumbered Roxburgh collection, cited below, is probably part of the type collection of *Ovieda verticillata* Roxb. Similarly, the Herb. Otterbein specimen from Essequibo, Guyana, in the Leningrad herbarium, also cited below, is probably a cotype of *Clerodendron longicolle* G. F. W. Mey. -- on its accompanying label it was confused

with *Ovieda ovalifolia* A. L. Juss., a synonym of *Clerodendrum floribundum* R. Br., which see (59: 419--425).

Keys to help distinguish *C. indicum* from other Assam and Indian species of the genus are given under *C. griffithianum* C. B. Clarke in the present series of notes (60: 134--136), from other Indochinese species under *C. hahnianum* Dop (60: 141--143), from Thailand taxa under *C. inerme* (L.) Gaertn., from other Madagascar species under *C. baronianum* Oliv. (58: 184--190), and from other Chinese species under *C. henryi* P'ei (60: 180--182). Other keys that may prove helpful are the following, all somewhat modified by me from the original for the sake of simplicity and nomenclatural accuracy.

Haines (1910) distinguishes the Chota Nagpur species as follows:

1. Leaves under $2\frac{1}{2}$ inches long; corolla white.....*C. phlomidis*.
- 1a. Leaves over 3 inches long.
 2. Leaf-blades ovate; corolla white or white and pink.*C. viscosum*.
 - 2a. Leaf-blades oblong or elliptic, often ternate; corolla blue, the tube $\frac{1}{3}$ to $\frac{1}{2}$ inch long.....*C. serratum*.
 - 2b. Leaf-blades narrow-lanceolate or linear-lanceolate, ternate or quaternate; corolla white, the tube 3--4 inches long.....*C. indicum*.

Parker (1924) distinguishes *C. indicum* from other Punjab species as follows:

1. Leaves opposite (or often whorled in *C. serratum*); stems solid.
2. Fruiting-calyx not or only slightly enlarged.
3. Calyx-lobes elongate; leaves less than 3 inches long.....*C. phlomidis*.
- 3a. Calyx-lobes short; leaves to $8\frac{1}{2}$ inches long.....*C. serratum*.
- 2a. Fruiting-calyx much enlarged, red.....*C. viscosum*.
- 1a. Leaves whorled; stems hollow.....*C. indicum*.

Osmaston (1927) distinguishes the Kumaon species as follows:

1. Leaves opposite (or often whorled in *C. serratum*); stems solid; corolla-tube less than 1 inch long.
2. Leaf-blades narrowly oblong, glabrous at least when mature.....*C. serratum*.
- 2a. Leaf-blades broadly ovate, persistently hairy.
3. Flowers in lax panicles 3--8 inches long; corolla single.....*C. viscosum*.
- 3a. Flowers in compact panicles 1-- $1\frac{1}{2}$ inches long; corollas doubled.....*C. philippinum* f. *multiplex*.
- 1a. Leaves whorled; stems hollow; corolla 3 or more inches long.....*C. indicum*.

[to be continued]



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