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Studies on Mikania (Compositae) - XI

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A study of the Mikania of Mexico has resulted in the discovery of the following new species

MIKANIA NEEI W Holmes, sp. nov

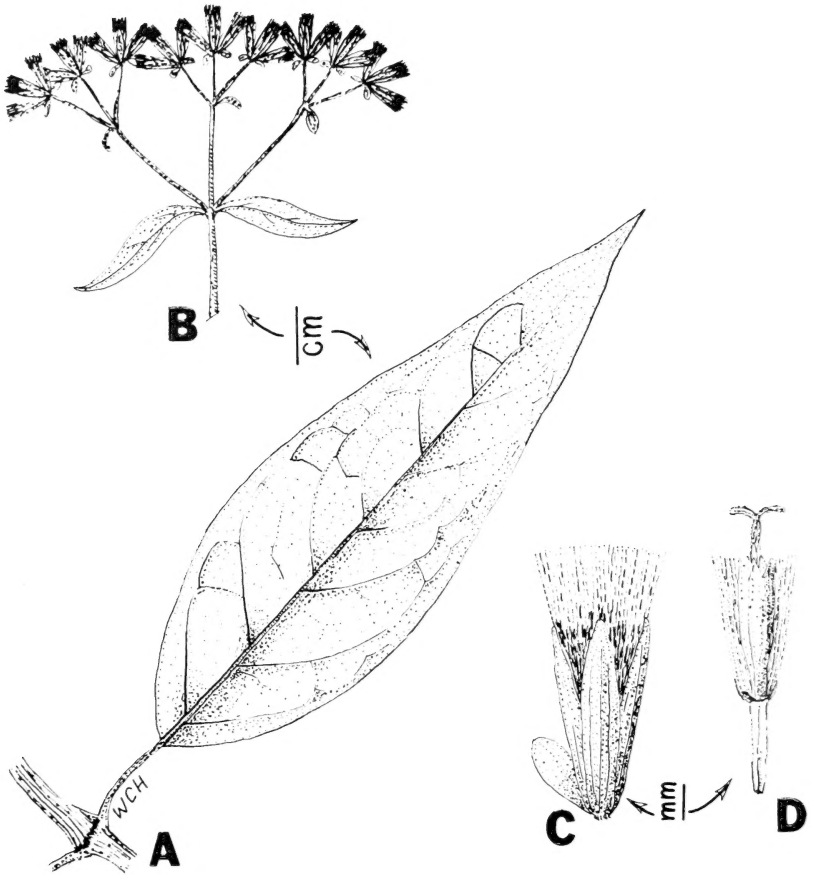
Suffrutex volubilis; foliis lanceolato-ovatis, ad 12 x 4 cm, apice acuminatis, basi obtusis vel rotundatis, marginibus integris; capitulescentiis corymbosis, capitulis ca. 8 mm longis, sessilibus, ternatis; corollis ca. 4.5 mm longis, dentibus limbi triangularibus, ca. 1 mm longis; achaeniis ca. 2 mm longis; pappi setis 40-45, ca. 4.5 mm longis; scabridis.

Semiwoody vine. Stems terete, striate, glabrous; internodes 8 cm or more long. Leaf blades lance-ovate, 12 x 4 cm, pinnately nerved with ca. 7 pairs of secondary nerves, these exerted from the surface, of ca. equal prominence and uniformly distributed along the midvein for nearly the entire length of the blade, upper surfaces glabrous, lower surfaces puberulent, apices acuminate, margins entire, bases obtuse to rounded; petioles ca. 1.8 cm long, puberulent. Capitulescence an open corymb, 4-4.5 x 8-9 cm; branchlets puberulent; bracteal leaves similar to cauline leaves but reduced in size. Heads ca. 8 mm long, sessile, ternately disposed. Subinvolucral bracts oblanceolate to obovate, 3-4.5 mm long, puberulent, apices rounded to acute. Phyllaries elliptic-oblong, 3, or 5 (or 7) nerved, apices acute to subacuminate to a rounded and puberulent point, the outer pair puberulent, the inner pair glabrate. Corollas ca. 4.5 mm long, tube ca. 1.4 mm long, throat subcylindric, ca. 2 mm long, teeth triangular, ca. 1 x 0.5 mm wide; style appendages hirsute. Achenes (immature) ca. 2 mm long. Pappus bristles 40-45, ca. 4.5 mm long, the margins scabrid.

Holotype: Mexico. Veracruz, E side of entrance of Laguna de Sontecomapan into the Gulf of Mexico, 7 km NE of Sontecomapan, Municipio de Catemaco, 0-50 m, 1 Nov 1981, M. Nee 22565 (TEX).

The open corymbose capitulescence with ternately disposed sessile heads and flowers with hirsute style appendages are the most distinctive features of the new species. These suggest relationship with Mikania guaco H. & B., a plant distributed from northern South America throughout Central America to southern Mexico. That species is distinguished by its usually scabrid, widely ovate to oval leaves with the bases being cuneately decurrent on the petiole. The venation pattern also differs in that two to three pairs of conspicuously prominent secondary nerves originate within the basal one-fourth of the blade. The capitulescence is denser, the heads being disposed in congested corymbs. Subinvolucral bracts differ in

being subulate to linear-lanceolate and 0.5 to 2 mm long, while the phyllaries have rounded apices.



*Mikania neei* W. Holmes. A. Leaf, B. Capitulescence, C. Head, and D. flower and achene.

NOMENCLATURE DE DEUX ESPECES DE LOBELIA L.

des PETITES ANTILLES

Par CLAUDE SASTRE

Comme suite à ma dernière publication sur la reconnaissance des divers taxons spécifiques et infraspécifiques des Lobelia L. des Petites Antilles ( C.R. Acad. Sci. Paris sér. 3. 4: 161-164, t. 300. 1985) j'apporte des éclaircissements sur la nomenclature de deux espèces: L. stricta Swartz et L. areolata Richard ex Jussieu

1. Lobelia stricta Swartz, Prodrômus 117. 1788.

SWARTZ indique qu'il a décrit cette espèce sur un spécimen: "India occidentalis, Guadeloupe". Il faut attendre 1806 (Fl. Indiae Occidentalis 3: 1952) pour qu'il donne plus de précision sur l'origine de ce spécimen: " In regione muscosa montis La Soufriere Guadelupae insulae legit de PONTHEIU".

Dans l'herbier de Swartz déposé à Sockholm existe un spécimen : " Guadeloupe, leg. De Ponthieu" correspondant bien à la description de L. stricta Sw.

Le spécimen déposé au British Museum sous le même nom, récolté aussi par De Ponthieu: "In regione muscosa montis La Soufriere copiosae" n'appartient pas à cette espèce mais à L. areolata Rich. ex Juss.

Il est fort probable que des collections d'origine diverse ont été regroupées et leurs étiquettes portent le nom d'une même localité, ce qui a conduit à des erreurs de nomenclature. L. stricta est connue de St. Kitts-Nevis et L. areolata de Guadeloupe, Dominique et Martinique.

Lectotypification

L'espèce de Swartz étant valablement décrite, le spécimen authentique existant, j'établis l'holotype sur le spécimen "Guadeloupe, leg. de Ponthieu" 5, bien que ce spécimen soit sûrement originaire de St. Kitts (anciennement Saint Christophe dont une partie était française au 17<sup>e</sup> siècle).

2. Lobelia areolata Richard ex Jussieu, Ann. Hist. Nat. 18: 3- 4. 1811.

Espèce décrite sur un spécimen envoyé par A. Richard à A.-L. Jussieu pour compléter l'étude de ce dernier sur les Lobéliacées et les Stylidées.

Syn. Tylomium flavescens Presl, Prodr. Monogr. Lobel. 32. 1836 nomen!

Tupa flavescens Candolle, Prodr. 7: 395. 1839; Duss, Fl. Phanér. Antil. Fr. 377. 1897. Type: Martinique, leg. Sieber (sous le nom de Lobelia conglobata Lam.) Holotype W, Isotype P.

Lobelia flavescens (DC.) Wimmer, Pflanzenreich 276 b : 626. 1957; Fournet, Fl. Ill. Phanér. Guadel. Martin. 598. 1978.

Tupa stricta auct. (Urban, McVaugh) non Swartz

Lobelia cirsiifolia auct. (Duss, Fournet) non De Candolle

Lobelia infesta auct. (Fournet) non (Grisebach) Urban

#### Typification

Le binôme de Jussieu étant valablement décrit, le spécimen type bien défini et existant, est l'holotype : "Guadeloupe, Soufrière, leg. Richard" JUSS-P.

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## CHROMOSOME NUMBERS IN PAEPALANTHUS (ERIOCAULACEAE)

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This chromosome investigation was initiated to help elucidate taxonomic problems in the preparation of a monograph of Paepalanthus subgenus Xeractis (sensu Koernicke 1863) by the junior author. Paepalanthus is a genus of over 490 species of South and Central America and the West Indies (Moldenke 1980). Subgenus Xeractis comprises 35 species of showy cauline or rosulate perennial herbs, characterized by large radiating involucre bracts which surpass the capitate inflorescence and by the presence of trichomes within the corolla tube of the male flowers. Despite the size and broad distribution of the genus, prior to the present study no chromosome numbers had been reported.

Materials and Methods. Flower heads with developmental series of buds were collected from plants growing in their native habitats. Heads were fixed in 70% ethanol and glacial acetic acid (3:1, v/v), transferred to 70% ethanol within a few days and refrigerated. Anthers were stained in Snow's stain or acetocarmine to which the dust of ferric ammonium citrate was added in minute quantities immediately prior to staining. Stained anthers were macerated and mounted in Hoyer's medium. Vouchers are deposited in MICH.

Results and discussion. Chromosome number determinations (Table I) were made for eleven individuals of seven species and one hybrid of Paepalanthus. Six species and the hybrid are diploid ( $\underline{n} = 25$ ); one species is tetraploid ( $\underline{n} = 50$ ). Although additional counts are needed to firmly establish a base number,  $\underline{x} = 25$  is suggested by these counts.

Except for the presence of two quadrivalents in the tetraploid P. mollis, no meiotic aberrations were detected. Bivalents were present in all diploid species investigated. In occasional specimens the chromosomes were sticky and uncountable or nearly so. This resulted in approximate determinations for two collections, one of P. argenteus (Hensold 297) and one of P. nigrescens (Hensold 366). Three additional counts for P. argenteus verified  $2\underline{n} = 25_{II}$  as the number for that species.

These counts represent the first reported for Paepalanthus or the large subfamily Paepalanthoideae Ruhland. Subgenus Xeractis is entirely endemic to the Serra do Espinhaco in Minas Gerais, Brazil. However,

most of the species have very restricted ranges so that most species pairs are not effectively sympatric. The taxonomy of the group is difficult, being confused by reticulate variation patterns, apparently relictual intermediate forms linking well-differentiated species, and the frequent occurrence of hybridization with either P. argenteus or P. nigrescens usually involved in the parentage.

The parents of the hybrid here studied, P. superbus x argenteus, are quite distinct from each other, the former being a thin-stemmed cauline species with dark brown bracts occurring in shallow soils, the latter a rosulate species of deep soils with a woody underground stem and cream-colored bracts. The lack of meiotic irregularities in the hybrid suggests that cytological differentiation in this group may be much delayed with respect to morphological differentiation.

The Pico Itambe population, from which the tetraploid count of P. mollis was obtained is geographically isolated from other known populations of the same species. It also differs from them morphologically in several respects such as larger, firmer involucre bracts, thicker leaves, and larger flowers with very broad petals, all of which may be linked to the higher ploidy level. Unfortunately, chromosome counts could not be obtained for these other populations. Similarly contrasting pairs of forms also occur in other species of the subgenus. Further cytological investigation is desirable to determine where shifts in ploidy level may be partly responsible for these differences.

Table I. Documentation for chromosome numbers in Paepalanthus.

- Paepalanthus argenteus (Bong.)Koern.  $2n = 25_{II}$ . BRAZIL: Minas Gerais, Biri Biri Valley, 12 km W of Diamantina, 1100 m, Hensold 276; westernmost ridge of the Serra do Cipo, near Fechados, 1100-1250 m, Hensold 594; Serra do Cipo, SW of Congonhas do Norte, 1150-1400 m, Hensold 757.  $2n = ca. 25_{II}$ . BRAZIL: Minas Gerais, road to Conselheiro Mata, 29 km W of the Diamantina - Datas road, Hensold 297.
- Paepalanthus chysolepis Silveira.  $2n = 25_{II}$ . BRAZIL: Minas Gerais, road to Conselheiro Mata, 23 km W of the Diamantina - Gouveia road, 1250 m, Hensold 307.
- Paepalanthus complanatus Silveira.  $2n = 25_{II}$ . BRAZIL: Minas Gerais, Serra da Pedra Redonda, ca. 17 km NE of Jose de Melo, 1100-1200 m, Hensold 418.
- Paepalanthus mollis (Bong.)Koern.  $2n = 46_{II} + 2_{IV}$ . BRAZIL: Minas Gerais, summit of Pico Itambe, N of Serrro, 2000 m, Hensold 613.
- Paepalanthus nigrescens Silveira.  $2n = ca 25_{II}$ . BRAZIL: Minas Gerais, ca. 19 km E of Hotel Chapeu de Sol on the road to Conceicao do Mato Dentro, 1350 m, Hensold 366.
- Paepalanthus superbus Ruhland.  $2n = 25_{II}$ . BRAZIL: Minas Gerais, Serra do Cipo, SW of Congonhas do Norte, 1150-1400 m, Hensold 751.



Table I, continued.

Paepalanthus superbus X argenteus.  $2n = 25_{II}$ . BRAZIL: Minas Gerais, Serra do Cipo, SW of Congonhas do Norte, 1150-1400 m, Hensold 754.

Paepalanthus uncinatus Gardn.  $2n = 25_{II}$ . BRAZIL: Minas Gerais, 4--5 km W of Itambe do Mato Dentro on the road to Serra Cabeça de Boi, Hensold 425.

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- Koernicke, F. 1863. Eriocaulaceae, in Martius, K. P. von, A.G. Eichler, and I. Urban, eds., *Flora Brasiliensis*. III. 1:273-507.
- Moldenke, H. N. 1980. A Sixth Summary of the Verbenaceae, Avicenniaceae, Stilbaceae, Chloanthaceae, Symphoremaceae, Nyctanthaceae, and Eriocaulaceae of the World as to Valid Taxa, Geographic Distribution, and Synonymy. *Phytologia Memoirs* 2:1-629.

A NEW SPECIES OF *ERYTHROXYLUM* (ERYTHROXYLACEAE)  
FROM SURINAME AND VENEZUELA

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In conjunction with his updating of the Flora of Suriname, J. C. Lindeman of Utrecht recently sent me two specimens of an *Erythroxylum* from Suriname that did not match any known species from that country. Subsequently I found this to be an undescribed species that matched several collections from southern Venezuela.

*Erythroxylum lindemanii* Plowman, sp. nov. Fig. 1.

Frutex vel arbor parva, ramulis rectis, tegumento cereo obtectis. Cataphylla disticha, stipulis foliorum similia. Stipulae foliariae persistentes, parvae, triangulari-ovatae, subcoriaceae, leviter striate nervosae, 3-setulosae. Folia petiolata, decidua; laminae ellipticae vel oblongae vel suborbiculares, chartaceae, ubique impolitaе, apice rotundatae retusae, basi obtusae vel rotundatae vel abrupte acuminatae. Flores pauci e brachyblastis vel ramulis hornotinis in axillis cataphyllorum nati. Petali lamina ovata, ad medium crassiuscula, concava, marginibus latis, tenuibus, recurvatis, ligula bilobata munita. Urceolus stamineus calycem aequans vel paulo superans, margine integer vel minute 10-crenulatus. Styli liberi. Drupa ellipsoidea vel ovoidea, apice rotundata, endocarpio anguste ovoideo tereti longitudinaliter nervoso uniloculari, endospermio mediocri.

Shrub or tree to 7 m tall with trunk to 10 cm diameter near base. Branches arising from near ground, extending vertically and horizontally. Branchlets distichous, consisting mainly of short shoots, straight or somewhat flexuous, diverging  $45^{\circ}$  -  $80^{\circ}$  from axis, lightly compressed at apex, 1 - 1.5 mm in diam, reddish brown, longitudinally wrinkled, becoming covered with a silvery waxy coating, rarely with small, punctate lenticels. Internodes on long shoots 1 - 25 mm long, on short shoots 0.5 - 4 mm. Cataphylls (ramenta) distichous, produced at base of new shoots for up to 5 mm, similar to but firmer than foliar stipules, turning reddish brown in age, the spinule dorsally flattened, lanceolate, 0.6 - 1 mm long. Foliar stipules

persistent, appressed to stem, broadly triangular to triangular-ovate, 1 - 1.7 (2.5) mm long, subcoriaceous, often covered with waxy flakes when new, striately nerved (though sometimes obscurely so), with 2 - 3 (5) nerves per side, obtuse to truncate at apex, 3-setulose, the lateral setae 0.2 - 0.8 mm long, the medial seta 0.1 - 0.2 mm long, sometimes wanting, the seta evanescent, the keels rib-like or sub-alate, the margin entire, rarely finely erose-denticulate. **Leaves** deciduous, 1 - 2 produced at apex of short shoots or scattered on long shoots, distichous, petiolate, the lamina plane, elliptic to ovate, oblong or suborbicular, rounded and usually retuse at apex, obtuse to rounded, acute or abruptly short-acuminate at base, sometimes slightly revolute at margin, 25 - 86 mm long, 15 - 42 mm wide, chartaceous, adaxially medium green, abaxially very pale greyish or yellowish green, dull to slightly shiny on both surfaces, elineate with no distinct central panel, the adaxial midrib slender, depressed in surface, drying ochreous to orange, the abaxial midrib drying yellowish to orange, the lateral nerves 11 - 14, diverging  $45^{\circ}$  -  $70^{\circ}$  from midrib, straight or slightly crooked, anastomosing 2 - 5 mm from margin, more or less distinct on both surfaces with finely reticulate veinlets. **Petiole** 3 - 7 mm long, 0.5 - 1 mm in diam, subterete in cross-section, narrowly canalliculate, drying ferruginous to dark brown. **Flowers** produced on new shoots in axils of cataphylls or rarely in leaf axils, 1 - 3 (5) flowers per node, creamy white, sometimes with a very short peduncle to 0.5 mm long. **Bracteoles** ovate to triangular-ovate, concave, 0.6 - 1 mm long, membranaceous, acuminate at apex, the seta 0.1 - 0.3 mm long. **Pedicel** slender, 5-ribbed, 4 - 6 mm long, 0.5 - 0.8 mm in diam, thickened slightly at apex. **Calyx** 1 - 1.5 mm long, divided 1/3 to 1/2 its length, the lobes short, transversely triangular, 0.3 - 0.8 mm long, acute to abruptly short-acuminate at apex, the margins much lighter in color than the middle. **Petal** lamina concave and thicker in texture in middle with broad, thin, recurving margins, ovate in outline, rounded at apex, 2 - 2.6 mm long, 1 - 1.7 mm wide, the claw 1 - 1.2 mm long, the ligule bilobed, 1 - 1.5 mm long, each lobe consisting of two auricles, the shorter anterior auricle rounded, 0.4 - 1 mm long, the longer posterior auricle ovate, 1 - 1.5 mm long, the auricles separated by a broad, inflexed anterior medial flap and a short, erect, posterior medial appendage. **Staminal cup** equaling to 1.5 times length of calyx, 0.8 - 1.3 mm long, the margin entire or minutely 10-crenulate. **Brachystylous flowers:** filaments ca. 3.2 mm long, strap-shaped, narrowed towards apex, the anthers orbicular

or elliptic in outline, often with somewhat unequal thecae, 0.5 - 0.6 mm long; styles free, 1.2 mm long; stigmas depressed-capitate, 0.2 mm long. **Dolichostylous flowers:** antisepalous filaments 0.6 - 0.9 mm long, the anthers suborbicular, with somewhat unequal thecae, 0.5 - 0.7 mm long; antipetalous filaments 1 - 1.7 mm long, the anthers smaller, 0.4 - 0.6 mm long; styles free, 2 - 2.5 mm long; stigma depressed-capitate, 0.1 - 0.3 mm long. **Ovary** narrowly ellipsoid, truncate at apex, 1.3 - 1.5 times length of staminal cup, 1.3 - 1.5 mm long. **Drupe** ovoid-ellipsoid, rounded at apex, ca. 8 mm long, ca. 4 mm in diam, yellow becoming light red at maturity, the mesocarp thin, the endocarp narrowly ovoid, 7.5 mm long, 3.5 mm in diam, terete, longitudinally nerved, unilocular, the endosperm occupying ca. 40% of locule. **Embryo** ca. 5.3 mm long, the cotyledons elliptic, subcordate at base, 5 mm long, 3 mm wide, 0.7 mm thick; radicle 1 mm long.

TYPE: Venezuela, Territorio Federal Amazonas, Depto. Átures, 51 km NNE of Puerto Ayacucho along the road to El Burro, laja near La Esperanza; elev. ca. 100 m; 5°59'N, 67°22'W, 21 April 1978 (fl), G. Davidse and O. Huber 15450 (holotype, F 1895307; isotypes, MO 2713735, VEN 133958).

ADDITIONAL SPECIMENS EXAMINED: **SURINAME:** area of Kabalebo Dam project, distr. Nickerie, 4° - 5° S, 57°30' - 58° W, alt. 30 - 130 m, savanna forest bordering on rock pavement E of km 117, "gujave," 18 Sept 1980 (st), J. C. Lindeman et al. 474 (F, U, Uw 26454), same locality, 9 Nov 1981 (fr), J. C. Lindeman & A. C. de Roon 793 (F, U).

**VENEZUELA:** Territorio Federal Amazonas, Dept. Átures: road northeast from Puerto Ayacucho towards El Burro, km 56 from Puerto Ayacucho, extensive granitic laja outcrop west of road, 28 Apr 1984 (fl), T. Plowman & F. Guánchez 13760 (F, TFA, VEN, 6 duplicates to be distributed); 35 km south of Puerto Ayacucho at the "Tobogán," on large igneous outcrop bordering forest, on flat ground at base of laja in tree island, alt. 85 m, 4 May 1977 (fl), J. A. Steyermark & O. Huber 113866 (US, VEN).

ETYMOLOGY: This species commemorates Dr. J. C. Lindeman of the Institute of Systematic Botany, Utrecht, who has made valuable contributions to our knowledge of the floras of Suriname and Brazil.

DISTRIBUTION: Known only from two rather disjunct areas: Puerto Ayacucho in southern Venezuela and the Nickerie District in Suriname. Future collecting in similar

habitats in the remote regions between these two areas will undoubtedly turn up additional stations.

**PHENOLOGY:** In Venezuela, flowering during April and May. In Suriname, the only fertile collection was fruiting in November.

**ECOLOGY:** All collections of *Erythroxyllum lindemanii* have been made in forest margins or tree islands on large granitic outcrops, called "laja" in Venezuela. In the area around Puerto Ayacucho, at least four species are restricted to this habitat and occur sympatrically with *E. lindemanii*. These are *E. impressum* O. E. Schulz, *E. williamsii* Standley ex Plowman, *E. rufum* Cav. and another undescribed species (Davidse & Huber 15072, 15187, 15280, 15593, Steyermark & Huber 113852, 122557, Plowman & Guánchez 13505, 13506, 13507, 13508, 13509, 13510, 13511, 13512, 13731, 13750). The latter will be described in a forthcoming paper on additional new species from Venezuela.

**COMMON NAME:** Gujave (Suriname).

**RELATIONSHIPS:** *Erythroxyllum lindemanii* belongs to section *Rhabdophyllum* based on the presence of stipular nerves with sclerified vascular bundles. However, in this species, the nerves are few in number, sometimes not well developed, and therefore are not readily observed in some specimens. It is easiest to observe the stipular nerves in older, dried stipules where the nerves tend to protrude. This species has no known close relatives and would seem to be allied to one of several species groups of sect. *Rhabdophyllum* found in central and eastern Brazil.

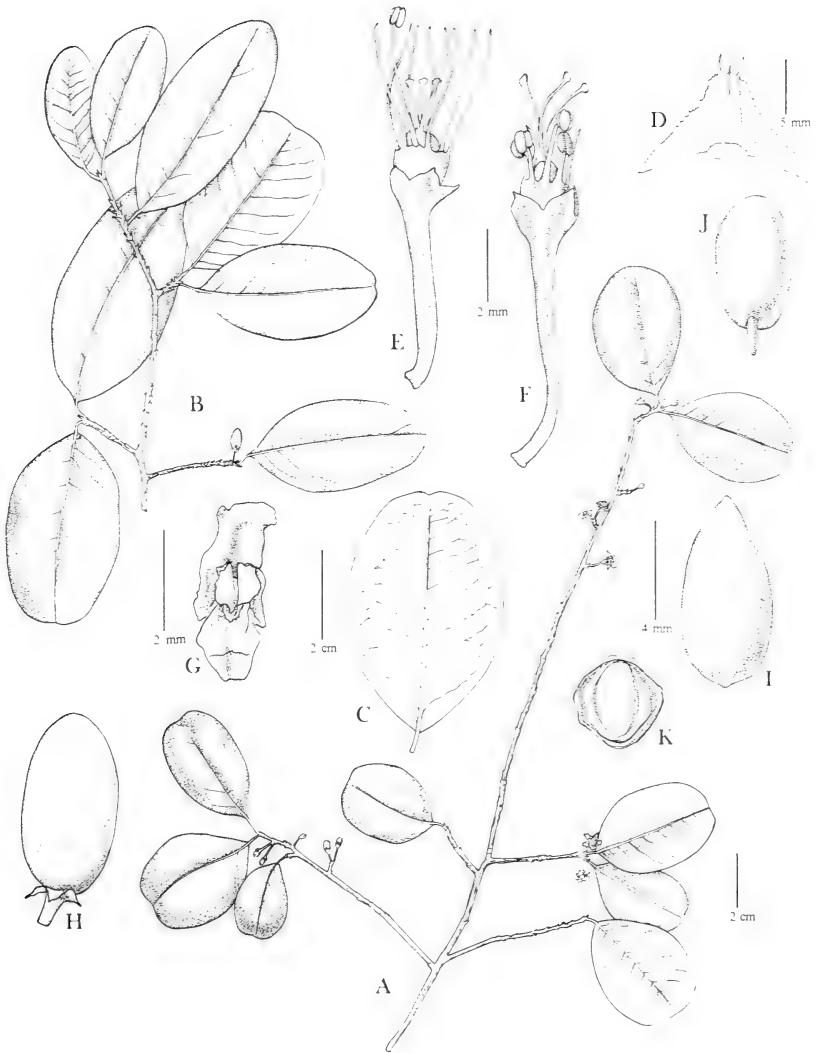
*Erythroxyllum lindemanii* superficially resembles several other species from the Guayana Shield, including the sympatric laja endemics mentioned above, and it may be easily confused with them. It differs from *E. impressum*, *E. williamsii*, and the undescribed species mentioned above (all sect. *Archerythroxyllum*) in having striately nerved stipules. *Erythroxyllum rufum*, of sect. *Rhabdophyllum*, differs from *E. lindemanii* in having blackish twigs with conspicuous light-colored lenticels, the flowers produced at "knobby" nodes on the past (not current) season's growth, and pedicels at least 10 cm long. It is of interest that *E. rufum* also occurs on igneous outcrops in north central Brazil. It is unlikely that *E. lindemanii* would be easily confused with any other species of sect. *Rhabdophyllum* known from the Guayana Region.

## ACKNOWLEDGMENTS

I wish to thank the curators of herbaria cited here for providing access to their specimens and Dr. J. C. Lindeman for sending me the interesting new material from Suriname. Fieldwork in Venezuela was supported by the Field Museum of Natural History. I am very grateful to Francisco Guánchez and Gustavo Romero of Puerto Ayacucho for their kind hospitality and logistic support during my fieldwork there. I am indebted to Michael Huft for helpful comments on the manuscript and to Marlene Warner for preparing the beautiful illustration.

## EXPLANATION OF FIGURE

Fig. 1. Erythroxylum lindemanii. A, habit of flowering branch; B, habit of fruiting branch, same scale as A; C, leaf showing venation; D, stipule; E, short-styled flower; F, long-styled flower; G, petal; H, fruit, same scale as I; I, endocarp; J, embryo, same scale as I; K, cross-section of endocarp, same scale as I. (A, C, D, F and G from Davidse & Huber 15450; B, H, I, J and K from Lindeman & de Roon 793; E from Steyermark & Huber 113866).



NOTES ON THE GENUS *CLERODENDRUM* (VERBENACEAE). VII

Harold N. Moldenke

This paper is a continuation of the notes on this genus begun by me in *Phytologia* 57: 157 (1985) and most recently continued in 57: 456--491 (1985).

*CLERODENDRUM* Burm.

Additional & emended bibliography: L., *Mant. Pl.*, imp. 1, 2: 423. 1771; Reichard in L., *Syst. Pl.* 3: 198. 1780; J. F. Gmel. in L., *Syst. Nat.*, ed. 13, imp. 1, 2: 962. 1789; Schum. & Thonn., *Beskr. Guin. Pl.* 287. 1827; Loud., *Encycl. Pl.* 522, 523, & 1116, fig. 8709. 1829; Schum. & Thonn., *Kongl. Dansk. Vidensk. Selek. Afhandl.* 4: 61. 1829; G. Don, *Gen. Hist. Dichlam. Pl.* 4: iv. 1838; W. Hook., *Comp. Bot. Mag.* 30. 1848; A. Rich. in Sagra, *Hist. Fis. Polit. Nat. Cuba* 11 (2): 146--147. 1850; Benth. in W. Hook., *Journ. Bot. Kew Gard. Misc.* 5: 136. 1853; Hassk., *Retzia* 1: 57--63. 1855; Kotschy, *Sitzungsber. Kais. Akad. Wiss.* 51: 8. 1858; Benth., *Fl. Hongk.* 272. 1861; Houliet, *Rev. Hort.* 39 [ser. 2, 2]: 310--312 & 420. 1867; Miq., *Ann. Mus. Bot. Lugd.-Bat.* 3: 252--253, pl. 9. 1867; J. F. Wats., *Ind. Nat. Scient. Names* 434 & 523. 1868; Schomb., *Fl. S. Austral.* 52. 1875; Vidal y Soler, *Phan. Cuming. Philip.* 21, 53, 55, 62, 64, 67, 74, 87, & 135. 1885; Oliv. in W. Hook., *Icon. Pl.* 16 [ser. 2, 6]: pl. 1559. 1887; Hemsl. in Forbes, *Journ. Linn. Soc. Lond. Bot.* 26: 143. 1890; Forbes & Hemsl., *Journ. Linn. Soc. Lond. Bot.* 26 [Ind. Fl. Sin. 2]: 259--263. 1890; Stapf, *Trans. Linn. Soc. Lond.*, ser. 2, 4: 522--523. 1896; Gürke, *Engl. Bot. Jahrb.* 28: 176--177, 192, [291]--305, & 466. 1900; Hiern, *Cat. Afr. Pl. Coll. Welw.* 1: 839--844. 1900; Vorderman, *Teysmannia* 11: 217. 1900; Hemsl., *Curtis Bot. Mag.* 129 [ser. 3, 59]: pl. 7922. 1903; Lauterb. in K. Schum. & Lauterb., *Nachtr. Fl. Deutsch. Schutzgeb. Südsee* 371--373. 1905; Baron, *Rev. Madag.* 363. 1906; Prain, *Ind. Kew. Suppl.* 3, imp. 1, 24, 44--45, & 133. 1908; A. Chev., *Sudania* 1: 43 & 62--67. 1911; Craib, *Kew Bull. Misc. Inf.* 1911: 443--445. 1911; Hosseus, *Bot. Centralbl. Beih.* 28 (2): 429. 1911; N. L. Britton, *Bull. Torrey Bot. Club* 39: 9--10. 1912; Craib, *Contrib. Fl. Siam Dicot.* 165. 1912; J. Matsumura, *Ind. Pl. Jap* 2 (2): 531--532. 1912; Pulle in Lorentz, *Nova Guinea* 8: 687. 1912; A. Chev., *Étud. Fl. Afr. Cent. Franç.* 1: 244--246. 1913; DeWild., *Bull. Roy. Soc. Bot. Belg.* 51 (3) [ser. 2, 1]: 14, 38, 47, 60, 91, 132, 145, 149, 180, 188, 192, 203, 216, 233, 268, 280, 294, 298, 306, 317, & 326, pl. 31. 1913; J. K. Small, *Fl. Miami* 159, 161, & 202. 1913; J. K. Small, *Shrubs Fla.* 117 & 136. 1913; Wernh. in Rendle & al., *Cat. Talb. S. Niger Pl.* 90--91. 1913; Fedde & Schust., *Justs Bot. Jahresber.* 41: 387. 1918; A. Chev., *Expl. Bot. Afr. Occ. Franç.* 1: 507--509. 1920; Fedde & Schust., *Justs Bot. Jahresber.* 42: 252. 1920; E. D. Merr., *Philip. Journ. Sci.* 19: 377. 1921; Fedde & Schust., *Justs Bot. Jahresber.* 44: 253. 1922; Anon., *Notes Roy. Bot. Gard. Edinb. List Seeds Coll.* 1923: 60. 1923; Bakh. in Bakh. & Lam, *Nova Guinea* 14, *Bot.* 1: 171. 1924; Chipp, *Kew Bull. Misc. Inf.* 1929: 185 & 193. 1929; J. M. Cowan, *Rec. Bot. Surv. India* 12: 70. 1929; Irvine,



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G. Don (1838) asserts in the index to his work that *Clerodendron* is mentioned on page "863", but I can find no such reference on that page nor anywhere else in the volume.

#### CLERODENDRUM ACULEATUM (L.) Schlecht.

Additional synonymy: *Volkameria aculeata* H. K. ex Loud., *Encycl. Pl.* 522. 1829.

Additional bibliography: Loud., *Encycl. Pl.* 522, 523, & 1116, fig. 8709. 1829; Uhlworm & Behrens, *Bot. Centralbl.* 18: 71. 1884; Mold., *Phytologia* 57: 391--404, 456--465, & 484. 1985.

Additional illustrations: Loud., *Encycl. Pl.* 523, fig. 8709. 1829.

#### CLERODENDRUM ANGOLENSE Gürke

Additional bibliography: Good & Exell, *Journ. Bot. Brit.* 68, *Suppl.* 2: 141. 1930; H. N. & A. L. Mold., *Pl. Life* 2: 52. 1948; Mold., *Phytologia* 57: 478--482. 1985.

Good & Exell (1930) cite *Gossweiler* 4813 & 5482 from Angola, giving the species' overall distribution as "Western Tropical Africa and Uganda."

#### CLERODENDRUM BAKHUIZENI Mold.

Additional bibliography: Mold., *Phytologia* 57: 491. 1985.

Calyx about 3 mm. long and 2 mm. wide, externally rather densely

puberulent with twisted, antrorsely subappressed, sordid hairs, its rim very shortly 4-denticulate; corolla hypocrateriform, its tube 8-9 mm. long, nigrescent in drying, externally very minutely pulverulent, the limb suberect, the lobes 2--3 mm. long, apically rounded, glabrous; stamens and pistil exerted to about 2 cm.; fruiting-calyx shallowly patelliform, 10--13 mm. wide, externally more or less irregularly puberulent, the rim shallowly and irregularly lobed or merely sinuate; fruit drupaceous, nigrescent in drying, subglobose, 8--10 mm. long and wide, much wrinkled in drying, externally glabrate.

The type of this puzzling species was collected from material cultivated in the Botanical Garden at Buitenzorg, Java, during or before 1916, and is sheet number 20766 in the Herbarium Bogoriense at that institution -- the file number of the cultivated plant being Hort. Bogor. XV.L.11. The plants were received at Buitenzorg and cultivated there as "*Clerodendrum glaucum* Wall." and it may well be that this *nomen nudum* of Wallich is to be reduced to synonymy here. In 1919 the distinguished botanical taxonomist, Reinier Cornelis Bakhuizen van den Brink, Sr., who has done such noteworthy and splendid revisionary work in this family of plants and to whom this species was respectfully dedicated, regarded it as *C. emirnense* Bojer, native to Madagascar. In 1924 he decided that it was, after all, not that species, but was *C. tomentosum* (Vent.) R. Br., native to tropical Australia and New Guinea.

The plant is certainly not *C. emirnense*, because that species, even in its variety *diffusum* Mold. (which has a somewhat similar inflorescence) has decidedly smaller and quite glabrous leaves. Also, it is not *C. tomentosum* because in that species the calyx and fruiting-calyx are 5-fid and the corolla is smaller. It somewhat resembles *C. aculeatum* var. *gracile* Griseb. & Mold., of the West Indies, which, however, has spinose stems and narrower leaves. Its ternate leaf arrangement reminds one of *C. molle* H.B.K., *C. margaritense* Mold., and *C. ternifolium* var. *mexiae* Mold., of northern South America, but in all of these the calyx-rim is deeply lobed and flaring. Similarly, *C. hircinum* Schau., *C. glabrum* var. *vagum* (Hiern) Mold., which it resembles in habit, have elongated calyx-lobes. In *C. pyrifolium* J. G. Baker and *C. sakaleonense* Mold. the leaves are glabrous, as they are also in *C. heterophyllum* (Poir.) R. Br., some forms of which our plant resembles. It bears striking resemblance to *C. rehmanni* Gdrke, but in that species the calyx is decidedly villous; *C. perrieri* var. *laxicyosum* Mold. is also similar, but has larger leaves and the pubescence on the pedicels and calyx is wide-spreading. It comes closest of all to *C. premnoides* Mold., of Madagascar, in which, however, the leaf-blades are thinner in texture, only sparsely strigillose beneath, the calyx and corolla are smaller, and the corolla-tube is plainly externally pilose.

Wigman (1912) says of *C. glaucum*: "is een krachtig groeiende plant, die nog al zaden geeft. De kleine éénbladige kelk heeft vijf zeer korte slipjes, de bloemkroonbuis is eveneens kort en eindigt ook in vijf kleine slipjes. De meeldraden zijn aan den voet wit en nemen in de nabijheid der helmknoppen een roode kleur aan; zij

steken een eind uit de bloempjes."

Louden (1830) asserts that *C. glaucum* was introduced into English gardens in 1825 from the "E. Indies".

Citations: CULTIVATED: Java: *Herb. Hort. Bot. Bogor. X.F.24* (Bz--20767, Bz--20768, Bz--20769, Bz--20770, Bz--20771, Bz--20772, Bz--20773, Bz--20774, Bz--20775, Bz--25486, Bz--25547, Bz--25696, N), *XI.G.106* (Bz--25805, Bz, N), *XI.G.106a* (Bz--25804, Bz--26543, Bz, Bz, Bz, N), *XV.F.22* (Bz--26329, Bz--26330, Bz--26544, Bz, N), *XV.F.22a* (Bz--26331, Bz--26545), *XV.J.A.XXXI.6* (Bz--26375, Bz--26376, Bz, Bz, Bz, N), *XV.J.A.XXXI.6a* (Bz--26377, N), *XV.L.11* (Bz--20766--type, Ld--photo of type, N--isotype, N--photo of type).

*CLERODENDRUM BARBA-FELIS* H. Hallier, *Meded. Rijks Herb. Leid.* 37: 74

[as "*barba felis*"]. 1918; *Mold., Suppl. List Inv. Names* 2: 1941.

Synonymy: *Clerodendrum barba felis* H. Hallier, *Meded. Rijks Herb. Leid.* 37: 74. 1918. *Clerodendron barba felis* Hall. f. ex H. J. Lam, *Verbenac. Malay. Arch.* 282 & 362. 1919. *Clerodendron barba-felis* Hall. f. apud E. D. Merr., *Bibl. Enum. Born. Pl.* 515. 1921.

Bibliography: H. Hallier, *Meded. Rijks Herb. Leid.* 37: 74. 1918; H. J. Lam, *Verbenac. Malay. Arch.* 282 & 362. 1919; Bakh. in Lam & Bakh., *Bull. Jard. Bot. Buitenz.*, ser. 3, 3: 94, 108, & viii. 1921; A. W. Hill, *Ind. Kew. Suppl.* 6: 49. 1926; *Mold., Suppl. List Inv. Names* 2: 1941; *Mold., Known Geogr. Distrib. Verbenac.*, ed. 1, 63, 65, & 89. 1942; *Mold., Alph. List Inv. Names* 16. 1942; *Mold., Phytologia* 2: 98. 1945; *Mold., Alph. List Cit.* 1: 210 (1946) and 3: 764. 1949; *Mold., Known Geogr. Distrib. Verbenac.*, ed. 2, 143, 145, & 180. 1949; *Mold., Re'sumé* 187, 192, 193, 260, & 448. 1959; *Mold., Fifth Summ.* 1: 321 & 440 (1971) and 2: 862. 1971; *Mold., Phytol. Mem.* 2: 312 & 534. 1980.

A subshrub, less than 1 m. tall, or tree, to 6 m. tall; stems terete, 2--3 mm. thick, rather irregularly hollow and myrmecophilous, grayish-white, at first very shortly and densely glandular-hispid, later glabrate, subrugose in drying; leaves decussate-opposite; petioles 2--4.5 cm. long, sulcate above, very shortly puberulent-hispidulous; leaf-blades rather large, thinly herbaceous, ovate or ovate-lanceolate, 10--25 cm. long, 4--10 cm. wide, apically shortly and rather acutely acuminate, marginally entire, basally rounded to subcordate, green and glabrous above, red or pale subglaucous-green beneath, very minutely puberulent and everywhere minutely glandular-punctulate; secondaries about 8 per side, spreading, subclathrate and arcuately joined near the margins; veinlets loosely reticulate, often conspicuous and more deeply colored (along with the midrib) beneath; inflorescence terminal, paniculate, thyrsoid, to 11 cm. long and 6 cm. wide, slender, very shortly glandular-hispidulous, the rachis thin, the branches trichotomous; peduncles short; bracts and bractlets minute, subulate; pedicels slender, 3--5 mm. long, slightly longer than the bractlets and calyx; flowers slightly fragrant; calyx reddish, about 2 mm. long, externally very shortly glandular-hispidulous, deeply 5-lobed, the lobes lanceolate, green, apically acuminate; corolla green or yellow to wine-color or dark-red, externally pulverulent-puberulent, the tube about 8 mm. long, about 4 times the

length of the calyx, the lobes 7 mm. long, narrowly obovate; filaments very long-exserted, surpassing the corolla-tube by about 2 cm.; fruiting-calyx much enlarged, stellately expanded, internally red; fruit drupaceous, globose, 6--7 mm. long and wide (immature?), dark-violet, externally loosely and very minutely pulverulent-puberulent.

This species is based on *Foxworthy* 239 & 489, the former in fruit, the latter in flower, from Sarawak, deposited in the Bratislava herbarium in Czechoslovakia. Hallier (1918) states that the species is closely related to *C. disparifolium* Blume (*C. eriosiphon* Schau.) "sed praeter alias notas calyce multo minore, tubo corollino brevior, panicula et calyce brevissime glanduloso-hispidulis, corolla extus pulverulento-puberula, panicula magis contracta bene distinctus." In regard to the specific epithet chosen he notes that the flowers resemble those of *Orthosiphon stamineum* Benth., whose vernacular name in the Sunda Islands is "kumis utking" or "cat's whiskers". He further notes "Ob auch *Foxworthy* no. 78 von Sarawak zur selben Art gehört, vermag ich nach dem ddrftigen Exemplar nicht zu entscheiden."

Collectors have found this species growing in primary and swampy forests, moist ravines, and at cave entrances on limestone cliffs, at 20--1000 m. altitude, in flower from April to July, as well as in September and October, and in fruit from March to June.

The corollas are described as having been "dark-red" on *Foxworthy* 78 "white and wine" on *Foxworthy* 489, "green" on *Foxworthy* 239, and "yellow" on *Teijsmann* 8501.

Vernacular names reported for the species are "badi", "kajoe si panggil tombak", "si panggil tombak", and "tcaicui". The leaves are said to be used with coconut oil in the treatment of skin diseases.

Material of *C. barba-felis* has been misidentified and distributed in some herbaria as *C. brevifolium* Ridl. or *C. laevifolium* Blume.

Lam (1919) asserts that the species is "Characterized by its extremely short corolla-tube". He cites no specimens and regards it as endemic to Sarawak. Bakhuizen (1921) also cites no material and regards it as endemic to "Borneo".

Citations: GREATER SUNDA ISLANDS: Kalimantan: *Teijsmann* H.B.8501 (Bz--18772). Sabah: *Gibot* SAN.29570 (Sn--40675), SAN.29573 (Sn--40676). Sarawak: *Clemens & Clemens* s.n. [field no. 7782] (N); *Foxworthy* 78 (Ph), 239 (Ph--cotype), 489 (Ph--cotype); *Native collector* 520 (Ph), 1376 (Ld--photo, N--photo, Ph). Sumatra: *Boeea* 7940 (Mi), 9467 (Mi); *Toroos* 3392 (Mi, Mi, N), 3416 (Mi, n, W--1680489), 3521 (Mi, N), 4023 (Mi, N, W--1680720).

*CLERODENDRUM BARONIANUM* Oliv. in W. Hook., Icon. Pl. 23: pl. 2241 [as "*Clerodendron*"]. 1892; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 89. 1942.

Synonymy: *Clerodendron baronianum* Oliv. in W. Hook., Icon. Pl. 23: pl. 2241. 1892.

Bibliography: Oliv. in W. Hook., Icon. Pl. 23: pl. 2241. 1892; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; Stapf, Ind. Lond. 2: 238. 1930; Durand & Jacks., Ind. Kew. Suppl. 1, imp.2, 101. 1941; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 89. 1942; Mold., Alph. List Cit. 1: 48. 1946; H. N. & A. L. Mold., Pl. Life 2:

49. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 122 & 180. 1949; Mold. in Humbert, Fl. Madag. 174: 148, 165, 167--168, & 267, fig. 25 (4). 1956; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 101. 1959; Mold., Résumé 155, 260, & 448. 1959; Mold., Résumé Suppl. 1: 10. 1959; Mold., Fifth Summ. 1: 321 & 440 (1971) and 2: 862. 1971; Mold., Phytol. Mem. 2: 247, 248, & 534. 1980.

Illustrations: Oliv. in W. Hook., Icon. Pl. 23: pl. 2241. 1892; Mold. in Humbert, Fl. Madag. 174: 165, fig. 25 (4). 1956.

A shrub; branches and branchlets slender, light-gray, glabrous, prominently lenticellate, the bark whitish; twigs very slender, whitish, prominently lenticellate, sometimes sulcate, glabrous or very sparsely strigillose in the sulcations; nodes not annulate; principal internodes 2--4 cm. long; leaves decussate-opposite; petioles stoutish, 2--8 mm. long, canaliculate and somewhat margined above, glabrous; leaf-blades thin-coriaceous, uniformly pale-green and very shiny on both surfaces, elliptic, 3--10.5 cm. long, 1.9--4.3 cm. wide, apically acute to short-acuminate, sometimes obtuse, marginally entire, basally acute or short-acuminate, glabrous on both surfaces; midrib slender, flat or subprominulous above, prominent beneath; secondaries slender, 5--8 per side, rather straight, divergent, often not much ascending nor arcuate, obscure or indiscernible above, prominent beneath, arcuately joined near the margins beneath; vein and veinlet reticulation obscure or indiscernible on both surfaces; inflorescence axillary and terminal, mostly concentrated in subumbellate fashion at the tips of the twigs; cymes mostly 3-flowered, short-pedunculate or sessile; peduncles (when present) stoutish, stramineous, 1--4 mm. long, glabrous, mostly obsolete; pedicels stout, stramineous, 6--18 mm. long, glabrous; foliaceous bracts absent; bractlets linear-subulate, 1--2 mm. long, glabrous; calyx coriaceous, rigid, stramineous, not nigrescent in drying, tubular, 2--2.5 cm. long, 8--10 mm. wide, glabrous, conspicuously venose, its rim deeply 5-lobed, the lobes ovate, erect, rigid, 5--7 mm. long, apically attenuate-acute; corolla hypocrateriform, its tube very narrow-cylindric, 7--9 cm. long, externally glabrous, infundibular-ampliate only at the very apex, its limb about 3 cm. wide, the 5 lobes subequal, elliptic or oblong-elliptic, about 1.5 cm. long and 1 cm. wide, apically rounded; stamens and style exerted about 3 cm. from the corolla-mouth; anthers elliptic, about 3 mm. long; stigma bifid, its lobes narrow-subulate; fruiting-calyx and fruit not known.

This species is based on *Baron 6616* from Antongil Bay, in north-eastern Madagascar, collected in or before January 1892, and deposited in the Kew herbarium. It is known only from Madagascar and the Comoro Islands and has been collected at 350 m. altitude.

An artificial key to the taxa of *Clerodendrum* known to me from Madagascar and the Comoro Islands follows:

1. Axillary peduncles 20 cm. long or longer, bifurcate, pendulous...  
*C. dependens.*
- 1a. Axillary peduncles, when present, less than 20 cm. long.
  2. Flowers appearing when the plants are mostly leafless.
  3. Calyx, pedicels, and inflorescence-branches glabrous.....  
*C. nudiflorum.*

- 3a. Calyx, pedicels, and inflorescence-branches densely puberulent.  
*C. nudiflorum* var. *puberulentum*.
- 2a. Flowers appearing when the plants are in leaf.
4. Corolla strongly zygomorphic, its tube strongly curved, anteriorly gibbous, posteriorly deeply split, the limb conspicuously 2-lipped.....*C. myricoides*.
- 4a. Corolla actinomorphic or only slightly zygomorphic, its tube straight.
5. Corolla-tube greatly elongate, 10--20 cm. long.
6. Leaves regularly whorled in groups of 3 to 6.....*C. indicum*.
- 6a. Leaves usually decussate-opposite, rarely ternate.
7. Inflorescence cauliflorous.....*C. cauliflorum*.
- 7a. Inflorescence not cauliflorous.
8. Calyx at time of anthesis membranous, light-textured; mature leaf-blades mostly incised-dentate or serrate.
9. Calyx at time of anthesis 4--5 mm. long.
10. Leaf-blades 7--12 cm. long and 2.5--5 cm. wide.*C. incisum*.
- 10a. Leaf-blades 1--3 cm. long and 4--10 mm. wide.....  
*C. incisum* var. *parvifolium*.
- 9a. Calyx at time of anthesis 10--20 mm. long.
11. Calyx at time of anthesis about 10 mm. long.....  
*C. incisum* var. *afzelii*.
- 11a. Calyx at time of anthesis about 20 mm. long.*C. mirabile*.
- 8a. Calyx at time of anthesis coriaceous or subcoriaceous, heavy; leaf-blades entire.
12. Calyx at time of anthesis 1.8--2.5 cm. long.*C. baronianum*.
- 12a. Calyx at time of anthesis 3--8 cm. long.
13. Corolla 11--18 cm. long.
14. Calyx nigrescent, not venose.
15. Calyx at time of anthesis 4.5--5 cm. long, flaring to 2.5 cm. at the apex.....*C. aucubifolium* var. *giganteum*.
- 15a. Calyx at time of anthesis 3.5--4 cm. long, not flaring, about 1 cm. wide at the apex.....  
*C. aucubifolium* var. *longiflorum*.
- 14a. Calyx not nigrescent, plainly venose.
16. Leaf-blades smooth on both surfaces, thick-leathery, the veinlets not prominent.....*C. bellum*.
- 16a. Leaf-blades roughened, firmly chartaceous, the veinlets prominent.....*C. chartaceum*.
- 13a. Corolla 4--8 cm. long.....*C. eucalycinum*.
- 5a. Corolla-tube shorter, usually less than 10 cm. long.
17. Leaf-blades densely squamulose or resinous-lepidote beneath.
18. Leaves ternate, the blades basally acuminate, elliptic, to 4.5 cm. wide; calyx at time of anthesis 2 mm. long, subtruncate; native.....*C. sakaleonense*.
- 18a. Leaves decussate-opposite, the blades basally deeply cordate, to 15 cm. wide; calyx at time of anthesis 7 mm. long, lobed almost to the base; exotic.....*C. kaempferi*.
- 17a. Leaf-blades not squamulose nor resinous-lepidote beneath.
19. At least the larger leaf-blades basally deeply cordate.
20. Calyx at time of anthesis 3--9 mm. long, the lobes not ex-

tending beyond the middle, not squamulose.

21. Calyx 3--5 mm. long, its lobes narrow, lanceolate, erect or appressed; corolla-tube 5--6 times as long as the calyx; stamens 2--2.8 cm. long; style 3--5 cm. long.....*C. buchanani*.
- 21a. Calyx 5--9 mm. long, its lobes ovate or deltoid, patent; corolla-tube 3--4 times as long as the calyx; stamens 4--6 cm. long; style 6--7 cm. long.....*C. speciosissimum*.
- 20a. Calyx at time of anthesis 10--12 mm. long, lobed practically to the base, squamose.....*C. villosum*.
- 19a. Leaf-blades basally not cordate.
22. Leaf-blades regularly serrate, dentate, or serrulate [*C. arenarium* may sometimes be looked for here].
23. Leaf-blades regularly coarsely dentate.
24. Branchlets, peduncles, pedicels, and calyx densely spreading-villosulous.....*C. hircinum* f. *dentatum*.
- 24a. Branchlets, peduncles, pedicels, and calyx glabrous, puberulous, or appressed-strigillose.
25. Leaves 1.5--4 cm. long, 1--1.5 cm. wide; calyx at time of anthesis 2--3 mm. long; corolla 1--2 cm. long.
26. Calyx at time of anthesis glabrous.....*C. paucidentatum*.
- 26a. Calyx at time of anthesis pilose.*C. emirnense* f. *dentatum*.
- 25a. Leaves 2.5--11.5 cm. long, 1.5--6.2 cm. wide; calyx at time of anthesis 6--10 mm. long; corolla about 3.5 cm. long..  
*C. calamitosum*.
- 23a. Leaf-blades regularly appressed-serrate or serrulate.....  
*C. serratum*.
- 22a. Leaf-blades normally entire or subentire.
27. Inflorescence elongate, drooping, racemiform or paniculate.
28. Inflorescence terminal, with a long continuous axis; calyx at time of anthesis lobed almost to the base; leaf-blades narrowly oblong, exotic.....*C. wallichii*.
- 28a. Inflorescence axillary, cymosely furcate with the branches making 180 degree angles with the axis; calyx at time of anthesis lobed for 1/3 its length; leaf-blades broadly obovate; native.....*C. vinosum*.
- 27a. Inflorescence not elongate nor drooping nor racemiform.
29. Inflorescence capitate and conspicuously involucrate with large, leaf-like, ovate bracts to 1.5 cm. long and 1.2 cm. wide.....*C. involucreatum*.
- 29a. Inflorescence not involucrate.
30. Leaves regularly very small, less than 2 cm. long and wide.
31. Leaves whorled.....*C. dauphinense*.
- 31a. Leaves normally decussate-opposite.
32. Pedicels and calyx at time of anthesis glabrate, appressed-strigillose, or scattered-pilose, or the pedicels only spreading-pubescent.
33. Inflorescence densely congested, subcapitate; leaf-blades mostly not orbicular nor emarginate.
34. Calyx-rim at time of anthesis truncate or subtruncate, obscurely apiculate.
35. Leaf-blades mostly less than 1.5 cm. long and 1 cm.



- wide.....
- 35a. Leaf-blades mostly 1.5 cm. long or longer.....  
*C. subtruncatum* f. *magnifolium*.
- 34a. Calyx-rim at time of anthesis distinctly toothed.
36. Leaf-blades mostly less than 1.5 cm. long and 1 cm. wide;  
 pedicels spreading-pubescent.....*C. ramosissimum*.
- 36a. Leaf-blades mostly 1.5 cm. long or longer; pedicels ap-  
 pressed-strigillose or glabrate.....*C. emirnense*.
- 33a. Inflorescence open; leaf-blades orbicular, apically emargin-  
 ate.....*C. humberti*.
- 32a. Pedicels and calyx at time of anthesis densely spreading-  
 hirsute.
37. Inflorescence densely congested-subcapitate.....*C. perrieri*.
- 37a. Inflorescence open, spreading...*C. perrieri* var. *laxycosum*.
- 30a. Leaves usually larger, mostly over 2 cm. long when mature.
38. Calyx at time of anthesis coriaceous, often heavy and tough in  
 texture.
39. Calyx at time of anthesis less than 10 mm. long.*C. roseiflorum*.
- 39a. Calyx at time of anthesis 10--40 mm. long.
40. Calyx at time of anthesis very heavy, nigrescent in drying,  
 not venose.
41. Leaf-blades thin-membranous or thin-chartaceous.
42. Calyx 1.8--2.3 cm. long.....*C. aucubifolium*.
- 42a. Calyx 3--4 cm. long.....*C. brunnescens*.
- 41a. Leaf-blades coriaceous, not brunnescent, narrowly oblanceo-  
 late or obovate.
43. Calyx at time of anthesis 2.5--4 cm. long.
44. Leaf-blades 3.5--7.5 cm. long, to 4.5 cm. wide; corolla-  
 tube equaling or slightly surpassing the calyx.  
*C. magnoliaefolium*.
- 44a. Leaf-blades 15--20 cm. long, to 8.8 cm. wide; corolla-  
 tube about twice as long as the calyx.....*C. albobviolaceum*.
- 43a. Calyx at time of anthesis 1--2 cm. long.
45. Calyx at time of anthesis cylindric or narrow-campanulate;  
 corolla-tube about twice the length of the calyx.*C. rubellum*.
- 45a. Calyx at time of anthesis broadly campanulate; corolla-  
 tube equaling or only slightly surpassing the calyx.....  
*C. rubellum* var. *anomalum*.
- 40a. Calyx at time of anthesis not particularly heavy, not nigres-  
 cent, venose.
46. Calyx at time of anthesis 3--4 cm. long.
47. Calyx at time of anthesis 3 cm. long; corolla-tube equal-  
 ing the calyx.....*C. mandrarensis*.
- 47a. Calyx at time of anthesis 3.5--4 cm. long; corolla-tube  
 surpassing the calyx.....*C. petunioides*.
- 46a. Calyx at time of anthesis 2 cm. long or less.
48. Leaf-blades thin-membranous.....*C. macrocalycinum*.
- 48a. Leaf-blades firmly coriaceous.
49. Corolla-tube equaling the calyx.....*C. lastellei*.
- 49a. Corolla-tube twice as long as the calyx.....*C. decaryi*.
- 38a. Calyx at time of anthesis herbaceous.
50. Inflorescence-branches and pedicels subtended by 1 or 2 large,

persistent, foliaceous, ovate bracts to 14 mm. long and 6 mm.

wide.....*C. insolitum*.

50a. Inflorescence-branches and pedicels not conspicuously bracteate.

51. Calyx at time of anthesis large, 1--3 cm. long.

52. Leaves regularly ternate.....*C. madagascariense*.

52a. Leaves normally decussate-opposite.

53. Calyx at time of anthesis gibbous-inflated, bell-like, apically short-toothed.....*C. gibbosum*.

53a. Calyx at time of anthesis not gibbous-inflated.

54. Calyx lobed almost to the base.

55. Calyx glabrous.....*C. thomsonae*.

55a. Calyx villous.....*C. villosicalyx*.

54a. Calyx-lobes extending only 1/4 or 1/2 to the base.

56. Calyx glabrous or subglabrous.

57. Corolla-tube infundibular, apically 1--1.5 cm. wide; corolla-limb 2--3 cm. wide.

58. Leaf-blades small, 2--4 cm. long, 1.5--2.2 cm. wide, firmly chartaceous, shiny, apically obtuse or rounded or even emarginate.....*C. myrtifolium*.

58a. Leaf-blades larger, to 10 cm. long, thin-membranous or chartaceous or even coriaceous, not shiny, apically acute.

59. Calyx at time of anthesis campanulate, apically flaring.

60. Calyx at time of anthesis 1.4--2 cm. long..*C. arenarium*.

60a. Calyx at time of anthesis 2.5--3 cm. long

*C. arenarium* var. *macrocalyx*.

59a. Calyx at time of anthesis not campanulate nor flaring.

61. Leaf-blades membranous, brunnescent; calyx at time of anthesis elliptic, 14--14 mm. wide, brunnescent; corolla-tube 1/4 longer than the calyx.....*C. ellioti*.

61a. Leaf-blades firmly chartaceous or coriaceous, not brunnescent; calyx at time of anthesis oblong-cylindric, not brunnescent; corolla-tube twice as long as the calyx.

62. Leaf-blades firmly chartaceous; pedicels filiform, about 15 mm. long; corolla-limb about 2 cm. wide.....

*C. farafanganense*.

62a. Leaf-blades coriaceous; pedicels stout, 5--7 mm.

long; corolla-limb 3 cm. or more wide...*C. moramangense*.

57a. Corolla-tube cylindric, apically 2--3 mm. wide; corolla-limb 1--1.5 cm. wide.....*C. filipes*.

56a. Calyx conspicuously pilose or puberulent.

63. Peduncles 1-flowered, appressed-strigillose; calyx appressed-strigillose.....*C. brunsvigioides*.

63a. Peduncles several-flowered, puberulent or short-pubescent with spreading or erect hairs; calyx puberulent or short-pubescent.

64. Corolla-tube equaling the calyx, broadly infundibular.

65. Branchlets, peduncles, pedicels, and calyx at time of anthesis very densely spreading-short-pubescent; leaf-blades narrow-lanceolate, 1.5--2.5 cm. wide....*C. comans*.

65a. Branchlets, peduncles, pedicels, and calyx at time of anthesis puberulent; leaf-blades broadly elliptic, 4.5 cm. wide.

66. Puberulence minute, visible only under a hand lens.....  
*C. sylvestre*.
- 66a. Puberulence coarser, plainly visible with the naked eye....  
*C. sylvestre* var. *pubescens*.
- 64a. Corolla-tube twice as long as the calyx, cylindrical or tubular or narrowly infundibular only at the apex.
67. Calyx at time of anthesis 1.1--1.5 cm. long, not apically wide-flaring.
68. Corolla-tube very narrowly infundibular; calyx at time of anthesis conspicuously ribbed; veinlet reticulation obscure or indiscernible on both leaf-surfaces.....*C. laxiflorum*.
- 68a. Corolla-tube tubular, gradually widened from the base to the apex; calyx at time of anthesis not ribbed; veinlet reticulation prominent on both leaf-surfaces.....*C. tubulosum*.
- 67a. Calyx at time of anthesis less than 1 cm. long, apically wide-flaring.....*C. hiulcum*.
- 51a. Calyx at time of anthesis small, 1.5--5 mm. long.
69. Flowers solitary or in clusters of 2 or 3.
70. Corolla-tube 2.5 cm. long or longer.....*C. kauderni*.
- 70a. Corolla-tube about 1 cm. long.....*C. pauciflorum*.
- 69a. Flowers aggregated into few- or many-flowered cymes.
71. Inflorescence congested, subcapitate or conglobate-capitate.
72. Corollas 1 cm. long or less.
73. Inflorescence conglobate, very densely bracteolate with conspicuous filiform or linear bractlets.....*C. globosum*.
- 73a. Inflorescence not conglobate, not conspicuously bracteolate.
74. Leaf-blades glabrous beneath; Aldabra.....  
*C. glabrum* var. *minutiflorum*.
- 74a. Leaf-blades densely pubescent beneath; Madagascar.....  
*C. grevei*.
- 72a. Corollas more than 1 cm. long.
75. Pedicels and calyx densely spreading-hirsutulous.....  
*C. perrieri* var. *macrophyllum*.
- 75a. Pedicels and calyx sparsely appressed-pilosulous or glabrate.
76. Calyx-rim at time of anthesis decidedly toothed; leaf-blades 5.5--15 cm. long, 2.5--6.5 cm. wide....*C. aggregatum*.
- 76a. Calyx-rim at time of anthesis truncate; leaf-blades mostly 1.5--3 cm. long, 0.5--2.2 cm. wide.....*C. peregrinum*.
- 71a. Inflorescence open, not at all subcapitate.
77. Calyx-rim truncate, subentire, or 5-apiculate.
78. Corolla-tube 6--17 mm. long.
79. Calyx at time of anthesis 3--4 mm. long.
80. Leaf-blades lanceolate-elliptic, 1--2 cm. wide.....  
*C. heterophyllum*.
- 80a. Leaf-blades linear, less than 1 cm. wide.....  
*C. heterophyllum* f. *angustifolium*.
- 79a. Calyx at time of anthesis 1.5--2.5 mm. long.
81. Leaves small, the blades 0.8--5 cm. long, apically very blunt; petioles strigillose.....*C. boivinii*.
- 81a. Leaves larger, the mature blades 4--9 cm. long, apically sharply acuminate; petioles glabrous or subglabrous.
82. Calyx at time of anthesis distinctly long-apiculate.....

*C. pyrifolium.*

- 82a. Calyx at time of anthesis subentire.  
 83. Inflorescence glabrous or very sparsely strigillose.  
 84. Corolla-tube 12--15 mm. long; leaf-blades densely im-  
 pressed-punctate beneath.....*C. mananjariense.*  
 84a. Corolla-tube 5 mm. long; leaf-blades not punctate be-  
 neath.....*C. manombense.*  
 83a. Inflorescence densely short-pubescent or tomentellous....  
*C. premnoides.*  
 78a. Corolla-tube about 25 mm. long.....*C. inerme.*  
 77a. Calyx-rim at time of anthesis definitely toothed or lobed.  
 85. Calyx-rim at time of anthesis conspicuously triangular-lobed,  
 the lobes wide-spreading.  
 86. Branches, petioles, lower leaf-surfaces, and inflorescence  
 more or less densely flavidous-pubescent with spreading hairs...  
*C. hircinum.*  
 86a. Branches, petioles, lower leaf-surfaces, and inflorescence  
 merely appressed-puberulent or rarely glabrescent.....*C. putre.*  
 85a. Calyx-rim at time of anthesis merely dentate.  
 87. Peduncles, branches of the inflorescence, and pedicels long-  
 pilose with spreading, twisted, yellowish hairs; bractlets nu-  
 merous, conspicuous, linear-elongate; calyx-lobes linear.....  
*C. emirnense* var. *diffusum.*  
 87a. Peduncles, branches of the inflorescence, and pedicels minute-  
 ly appressed-puberulent; bractlets not especially numerous nor  
 conspicuous; calyx-lobes triangular.  
 88. Corolla 1 cm. long.....*C. putre* var. *subglabratum.*  
 88a. Corolla 2 cm. long.....*C. micans.*  
 Citations: COMORO ISLANDS: Grand Comoro: *Boivin s.n.* [Mayotte,  
 1846-48] (N, V). MADAGASCAR: *Baron 6616* (F--photo of type, K--type,  
 Ld--photo of type, N--isotype, N--photo of type, P--isotype); *Curtis*  
*s.n.* [Herb. Veitch 1897] (K); *Lam & Meeuse 5839* (Le--93970-429, N);  
*Richard s.n.* [Ste. Marie (P)].

*CLERODENDRUM BAUMII* Gürke in Warburg, Kunene-Sambesi Exped. 351 [as  
 "Clerodendron"]. 1903; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt.  
 Clerod.] 62 & 92. 1936.

Synonymy: *Clerodendron baumii* Gürke in Warburg, Kunene-Sambesi Ex-  
 ped. 351. 1903.

Bibliography: Gürke in Warburg, Kunene-Sambesi Exped. 351. 1903;  
 Hegi in Warburg, Kunene-Sambesi Exped. 443. 1903; Prain, Ind. Kew.  
 Suppl. 3: 44. 1908; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.]  
 36, 62, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1,  
 50 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 50. 1948; Mold., Ré-  
 sumé 140, 146, & 448. 1959; Mold., Résumé Suppl. 4: 7 (1962) and 12:  
 6. 1965; Mold., Fifth Summ. 1: 228 & 242 (1971) and 2: 862. 1971;  
 Mold., Phytol. Mem. 2: 218, 232, & 534. 1980.

An undershrub, about 60 cm. tall, or an aromatic bushy shrub, 1.5  
 --3 m. tall; rootstock polycephalous; stems annual, tetragonal, hol-  
 low; pith chambers narrow; branches hollow, pubescent; leaves de-  
 cussate-opposite; petioles 2--2.5 cm. long; leaf-blades herbaceous,

ovate, 3--5 cm. long, 2--4 cm. wide, the upper much smaller, apically acute, marginally entire, basally attenuate into the petiole, pubescent on both surfaces; flowers fragrant, solitary in the axils of the upper leaves or in 2- or 3-flowered cymes on long peduncles; bracts large, purplish-green, lanceolate, 10--15 mm. long, much shorter than the peduncles; calyx campanulate, 2.2--2.4 cm. long during anthesis, externally pubescent, the rim 5-dentate, the teeth triangular, 10--12 mm. long and basally about equally wide, apically acute; corolla white, the tube long-tubular, 9--10 cm. long, 4 or 5 times as long as the calyx, externally puberulent, the limb 5-lobed, the lobes unequal; pistil and stamens very long-exserted; filaments reddish to dark-red; fruiting-calyx accrescent, turning red; fruit black.

This species is based on *Baum 661* from sandy soil on the shore of a Maramba-like indentation of the left Longa beach above Lazingua, at 1250 m. altitude, Angola, collected in flower on January 20, 1900, and deposited in the Berlin herbarium, now doubtless destroyed. Gürke (1903) comments that "Die Art ist durch die Form der Blätter, deren Lamina sich in den Blattstiel verschmälert und an demselben herabblüht, von den übrigen langröhrigen *Clerodendron*-Arten sehr gut verschieden".

Thomas (1936) cites only the type collection, *Baum 661*, and *Pocock 324*, also from Angola.

Collectors have encountered *C. baumii* in open bushland on hill-sides, in shrubby or semishrubby thickets, and in sandy soil of beaches, at 1200--1340 m. altitude, in flower in January, March, and June, and in fruit in June and July. The corollas are described as "white" on the *Baum*, *Callens*, and *Pocock* collections, but as "greenish-yellow" on *Germain 2194*.

Vernacular names for the species, as reported by collectors, are "imbolemboli", "itanda-tanda-uá-ussáki", "ludja", "mabulakatu", and "tshindji". *Pocock* reports that the plant grows in large patches and "is very conspicuous in the fruiting stage because of the red color" [of the fruiting-calyxes?].

Material of *C. baumii* has been misidentified and distributed in some herbaria as *C. welwitschii* Gürke.

Citations: ZAIRE: *Callens 2446* (N), *4032* (N); *Germain 2194* (Br, Br, Br); *Vanderyst 16089* (Br), *16094* (Br, Br), *16105* (Br, Br), *16762* (Br), *17383* (Br), *17386* (Br), *17544* (Br), *17546* (Br), ANGOLA: *Benguela: Campos Andrada 56* (U1). Bié-Cuando-Cubango: *E. J. Mendes 3134* (Ld, U1), *3219* (U1). Lunda: *Barros Machado 262* (U1), *325* (U1), *370* (U1), *413* (U1); *Gossweiler 14155* (B, W--2074496). Province undetermined: *Pocock 326* [between Chihelwee and Muye] (Af).

*CLERODENDRUM BELLUM* Mold., Amer. Journ. Bot. 38: 321. 1951.

Bibliography: Mold., Amer. Journ. Bot. 38: 321. 1951; Mold. in *Humbert, Fl. Madag.* 174: 148, 170--172, & 267, fig. 26 (5 & 6). 1956; Mold., *Resume* 155 & 448. 1959; *G. Taylor, Ind. Kew. Suppl.* 12: 36. 1959; Mold., *Fifth Summ.* 1: 259 (1971) and 2: 862. 1971; Mold., *Phytol. Mem.* 2: 248 & 534. 1980.

Illustrations: Mold. in *Humbert, Fl. Madag.* 174: 171, fig. 26 (5 & 6). 1956.

A shrub, 3--4 m. tall; branchlets and twigs slender, obtusely tetragonal, often compressed at the nodes, prominently lenticellate, gray or grayish, glabrous; nodes not annulate; principal internodes much abbreviated on the twigs, elongate to 10 cm. or more on vigorous shoots; leaves decussate-opposite or approximate; leaf-scars large and prominent; petioles stoutish, 2--10 mm. long, glabrous; leaf-blades subcoriaceous, uniformly very light-green on both surfaces, not at all brunnescenscent, elliptic or obovate, 4--10.5 cm. long, 1.6--5.5 cm. wide, apically acute or short-acuminate, marginally entire, basally acute, glabrous and shiny on both surfaces; midrib stoutish, flat or subimpressed above, rounded-prominent beneath; secondaries slender, 2--4 per side, very irregular and distant, subimpressed above, mostly not at all prominent beneath, very irregularly joined near the margins; veinlet reticulation very sparse, mostly obscure on both surfaces; inflorescence axillary or subterminal, mostly 1-flowered, sometimes 2-flowered; peduncles much abbreviated, mostly 5--7 mm. long, glabrous; pedicels stout, brunnescenscent, about 3 cm. long, glabrous; bractlets and prophylla absent or caducous; calyx subcoriaceous, obconic-tubular, 4--6 cm. long, 1--1.5 cm. wide, not plainly venose, glabrous, its rim deeply 5-lobed, the lobes ovate, erect, firm, 10--12 mm. wide, apically attenuate-acute and subulate-apiculate; corolla infundibular, rose-color, its tube narrow-cylindric, about 12 cm. long, infundibular-ampliate only at the apex, glabrous, the lobes obovate, about 3 cm. long and 2.5 cm. wide, apically rounded, glabrous on both surfaces, subequal; stamens and pistil exerted about 2 cm. from the corolla-mouth; filaments glabrous; anthers oblong, about 5 mm. long; style glabrous; stigma bifid, its branches about 2 mm. long.

This handsome species is based on *Perrier 10250* from wet woods, at 1500 m. altitude, at Manankazo, northeast of Ankazobe, in central Madagascar, collected in September of 1913, and deposited in the Paris herbarium.

Citations: MADAGASCAR: *Perrier 10250* (E--photo of type, F--photo of type, Ld--photo of type, N--fragment of type, P--photo of type).

*CLERODENDRUM BETHUNIANUM* Low, Sarawak 378 [as "*Clerodendron*"; H. Hallier, Meded. Rijks. Herb. Leid. 37: 81. 1918.

Synonymy: *Clerodendron bethunianum* Low, Sarawak 378. 1848. *Clerodendron bethuneanum* Low apud W. J. Hook., Curtis Bot. Mag. 88 [ser. 3, 18]: pl. 5294 in textu. 1862; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893. *Clerodendron bethuneanum* Lowe ex Voss in Vilm., Blumengärt. 1: 832. 1895. *Clerodendron squamatum* var. *bethuneana* (Lowe) Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 94. 1921. *Clerodendron squamatum* Hallier f. apud E. D. Merr., Enum. Philip. Flow. Pl. 3: 400 in syn. 1923 [not Vahl, 1791]. *Clerodendron squamatum* var. *bethuneana* Bakh. apud E. D. Merr., Enum. Philip. Flow. Pl. 3: 400 in syn. 1923. *Clerodendron bethuneanum* Hook. f. ex Mold., Phytol. Mem. 2: 384 in syn. 1980. *Clerodendron bethunianum* Lour. ex Mold., Phytol. Mem. 2: 384 in syn. 1980. *Clerodendron bethuneanum* Lowe ex Mold., Phytol. Mem. 2: 390 in syn. 1980.

*Clerodendron bethuneanum* Law. ex Mold., Phytol. Mem. 2: 384 in syn. 1980. *Clerodendron bethumianum* Lowe, in herb. *Clerodendron bethuneana* Low, in herb. *Clerodendrum bethuneanum* Low, in herb.

Bibliography: Low, Sarawak 378. 1848; W. Hook., Comp. Bot. Mag. 1848: 30. 1848; J. E. Sm., Curtis Bot. Mag. 75 [ser. 3, 5]: pl. 4485. 1849; Miq., Fl. Ind. Bat. 2: 1083. 1859; Anon., Journ. Hort. 28 [ser. 2, 3]: 515. 1862; W. J. Hook., Curtis Bot. Mag. 88 [ser. 3, 17]: pl. 5294. 1862; Warb., Engl. Bot. Jahrb. 10: 428. 1870; Ceron, Cat. Pl. Herb. Manila 133. 1892; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893; Voss in Vilm., Blumengärt. 1: 832. 1895; Gibbs, Journ. Linn. Soc. Lond. Bot. 42: 123. 1914; H. Hallier, Meded. Rijks Herb. Leid. 37: 81. 1918; H. J. Lam, Verbenac. Malay. Arch. 297 & 362. 1919; Bakh. in Lam & Bakh., Bull. JARD. Bot. Buitenz., ser. 3, 3: 93, 94, 108, & viii. 1921; E. D. Merr., Bibl. Enum. Born. Pl. 516. 1921; E. D. Merr., Enum. Philip. Flow. Pl. 3: 400. 1923; Stapf, Ind. Lond. 2: 238. 1930; Fedde & Schust, Justs Bot. Jahresber. 53 (1): 1073. 1932; Rehnelt, Pareys Blumengärt., ed. 1, 280. 1932; Mold., Alph. List Comm. Vern. Names 3, 4, 14, 17, 20, 21, & 31. 1939; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62, 64, 65, 71, & 89. 1942; Mold., Phytologia 2: 98. 1945; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560. 1946; Mold., Alph. List Cit. 1: 8, 191, 192, & 210 (1946) and 2: 358, 462, 463, 528, 567, & 602. 1948; H. N. & A. L. Mold., Pl. Life 2: 50. 1948; Mold., Alph. List Cit. 3: 721, 765, 841, & 969 (1949) and 4: 1133 & 1134. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 141, 144--146, 158, & 180. 1949; Syngé in Chittenden, Roy. Hort. Soc. Dict. Gard., ed. 2, 1: 505. 1956; Mold., Résumé 179, 183, 187, 190, 192--194, 215, & 448. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560. 1960; Mold., Résumé Suppl. 3: 21. 1962; Mold., Fifth Summ. 1: 304, 315, 321, & 358 (1971) and 2: 862, 971, & 972. 1971; Mold., Phytologia 28: 455. 1974; Mold., Phytol. Mem. 2: 295, 306, 312, 348, 384, 389, 399, & 534. 1980; Mold., Phytologia 50: 258. 1982.

Illustrations: J. E. Sm., Curtis Bot. Mag. 75 [ser. 3, 5]: pl. 4485 (in color). 1849.

A shrub or small tree, 1--8 m. tall, flowering when still very small; stems green, 1--7 cm. in diameter at breast height, 1--10 cm. in girth; branches and branchlets very stout, pithy or hollow, very sharply tetragonal, usually sulcate on 2 opposite sides, with interpetiolar margins, minutely puberulent or pulverulent, often becoming glabrate on the internodes and very villous at the nodes; pith transversely lamellate; nodes annulate; principal internodes 4.5--5 cm. long; leaves decussate-opposite, the upper ones much smaller than the lower ones; petioles stoutish or stout, 3--42 cm. long, 5--6 mm. thick, minutely puberulent or glabrous, basally ampliate, striate; leaf-blades/membranous or thin-chartaceous, ovate, 5--36 cm. (mostly 30--36) long, 5.8--36 (mostly 17--36) cm. wide, apically acute or very shortly acuminate, marginally very minutely denticulate with broadly triangular apiculate teeth, varying to subentire, sometimes obscurely lobed, basally deeply cordate or cordate-rotundate, hirsutulous with scattered, rather elongate, twisted hairs or merely puberulent to glabrous above, minutely puberulent or strigillose to glabrous beneath and sparsely to very densely covered with crateri-

form scales; midrib rather stout, prominulent above, rounded-prominent beneath; secondaries slender, 5--7 per side, the 2 or 4 lowermost issuing from the very base of the leaf-blade and with rather strong, transverse, downward-pointing tertiaries, prominulent above, prominent beneath; vein and veinlet reticulation rather sparse, mostly obscure above; inflorescence terminal, paniculate-thyrsoïd or pyramidal, 30--90 cm. long and wide, very minutely puberulent, many-flowered, composed of 5--8 (or more) pairs of opposite rather long-stalked cymes, the lowermost pairs subtended by foliaceous stipitate bracts similar to the leaves in all respects but smaller, the nodes villous, or in loose axillary clusters 7.5--13 mm. wide; peduncles 10--15 cm. long, very deep carmine-red, glabrous; inflorescence-branches similar to the peduncles, carmine-red, glabrous; bractlets numerous throughout the inflorescence, linear or oblong to lanceolate, 5--15 mm. long, 0.5--3 mm. wide, sessile, crimson or very deep carmine-red; pedicels slender, 2--10 mm. long; calyx membranous, varying from red or very deep carmine-red to crimson, inflated during anthesis and about 6 mm. long and 5 mm. wide, externally glabrous, 5-ribbed, 5-cleft to about the middle, the lobes broadly ovate or deltoid, basally overlapping, 10 mm. long or longer, 5--8 mm. wide at the base, apically acute; corolla infundibular, reddish or red to dark- or blood-red or crimson, sometimes maroon or yellowish, glabrous, the tube 1--1.4 cm. long, barely surpassing the calyx or only subequaling it, basally very narrow, apically subinfundibular, the limb 5-lobed, the lobes elliptic, rather elongate, 6--8 mm. long, 4 (including the lateral ones) with a purple or purple-red basal spot, the 5th with a larger white spot, eventually reflexed; stamens inserted in the throat of the corolla-tube, exerted 3.5--5.5 cm. from the corolla-mouth; filaments very deep carmine-red; style equaling the stamens; ovary apically 4-lobed, externally glabrous; fruiting-calyx cupuliform, 7--15 mm. long, to 13 mm. wide, deeply 5-lobed in often stellate fashion, the lobes ovate-triangular, about 5 mm. long and basally 4--8 mm. wide, apically sharply acute, often irregular and wide-spreading; fruit drupaceous, depressed-tetragonal, about 5 mm. long and 8 mm. wide, at first greenish to purplish-green, finally red or blood-red, conspicuously venose (the veins prominent in drying), apically conspicuously and deeply 4-lobed, externally glabrous, often more or less included by the fruiting-calyx.

Voss (1895) comments that "Alle Teile dieser Art sind schön". The species is based on an unnumbered Low collection from Sarawak. Incidentally, this collector was Sir Hugh Low (1824--1905), who collected also in Singapore, Malaya, Java, and Borneo. Many authors have erroneously written his surname as "Lowe", thereby confusing him with no less than 4 other botanists who have collected verbenaceous material: C. H. Lowe, Jr. (who collected in Mexico in 1960), Charles W. Lowe (who collected in Canada), Ephraim Noble Lowe (1864--1933) (who collected in Mississippi), and Rev. Richard Thomas Lowe (1802--1874) (who collected in Africa).

Collectors have encountered *C. bethunianum* in open places, bordering cultivated areas and adjacent to human habitations, on riverbanks and along forest streams and roadsides, on undulating flatlands, in primary hillside forests, damp forests, and secondgrowth forests,



at 200--1300 m. altitude, in flower in every month of the year, and in fruit from March to December. Merrill (1923) reports that in the Philippines it is found "In thickets, clearings, and secondary forests at low altitudes", noting that it is "very similar to *C. intermedium* Cham." and listing it also from Borneo and Celebes. In his 1921 work he cites Gibbs 3131, Low s.n., & Yates 16 from Sabah and Hose 88 from Sarawak.

The corollas are said to have been "red" on Agor 3, Clemens & Clemens 21782, Kadir A.2008, Native collector s.n., and Williams 2584, "reddish" on Abas SAN.85902 and Sigin & al. SAN.99770 & 99800, "dark-red" on Aban G. SAN.94568, "blood-red" on Kienholz s.n. and Ramos & Edaño Philip. Bur. Sci. 44453, "maroon" on Sundaling SAN. 97330, "red, the throat white" on Santos 4193, "red with 3 segments purple and white at the base" on Clemens & Clemens 20641, and "yellowish" on Fedilis & Sumbing SAN.95685.

Vernacular names recorded for the species are "anóran", "antutuñgau-pulá", "binewang", "biniúang", "ganalum", "gudnton", "kali-kali", "maitúm", "matá-kuó", "oyang", "pangil pangil", and "udan-udan". In the Philippines a decoction of the roots is used to treat late menstruation.

Lam (1919) cites from the Philippines: Elmer 12649 & 13641, from Celebes Elbert 2933, 2994, & 2998, from Borneo Amdjah 96, 374, & 421, Hallier B.1539 & B.3090, Haviland & Hose 3558E, Korthals H.L.-B. 908.266-1216, and Rutten 126 & 242, and questionably from Java Zollinger 2557 in part [the other parts being, in his opinion, *C. speciosissimum* and *C. hettae*].

Merrill (1921) lists the species from Sabah, Sarawak, Celebes, and the Philippines and questionably from Java. In his 1923 work he lists it from Balabac, Basilan, Catanduanes, Cebu, Leyte, Luzon, Masbate, Mindanao, Negros, Palawan, Panay, and Polillo in the Philippine Islands, citing Ahern 827, Elmer 12649 & 13641, Félix 15533, Foxworthy 602, Merrill 3065, 8119, & Philip. Bur. Sci. 786, Ramos 30263, Ramos & Edaño 38695 & 39076, Reillo 15480, Robinson 18113, Wenzel 1044, and Williams 2584.

Bakhuizen (1921) cites only Elmer 12649 from the Philippines, listing the species also from the Malay Archipelago, Borneo, and Celebes.

Curiously, Merrill (1923), in his bibliography of the species, cites Hooker's "Comp. Bot. Mag. 30 (1848) 30", but Hooker's "Companion to the Botanical Magazine" comprises only 2 volumes, published, respectively, in 1835--1836 and 1836--1837. As yet I have been unable to identify Merrill's reference. Lam (1919) also also refers to a Comp. Bot. Mag. publication in "1848".

*Clerodendrum bethunianum* has very frequently been confused with *C. intermedium* Cham., *C. kaempferi*(Jacq.) Sieb., and *C. japonicum* (Thunb.) Sweet -- the former having the calyx during anthesis less than 10 mm. long, while the latter has it 10--15 mm. long. The two following artificial keys may help to distinguish *C. bethunianum* from its nearest relatives: Key 1:

1. Leaf-blades either not squamulose beneath or very sparsely so or the scales hidden by the dense pubescence or tomentum.
2. Inflorescence-branches with the flowers borne conspicuously on

- one side only in somewhat scopariform fashion.....*C. scopiferum*.
- 2a. Inflorescence-branches bearing flowers on all sides, not scopariform.
3. Leaf-blades subglabrous beneath.
4. Calyx in anthesis 5--10 mm. long.....*C. singalense*.
- 4a. Calyx in anthesis 2--4 mm. long....*C. buchanani* var. *glabrum*.
- 3a. Leaf-blades densely puberulent or pubescent beneath.
5. Calyx in anthesis 3--5 mm. long, its lobes narrow, lanceolate, erect or appressed; corolla-tube slender, 5--6 times as long as the calyx; stamens 2--2.5 cm. long; style 3--4 cm. long; leaf-blades more or less densely puberulent beneath....*C. buchanani*.
- 5a. Calyx in anthesis 5--9 mm. long, its lobes ovate or deltoid, spreading; corolla-tube slender, 3--4 times as long as the calyx; stamens 4--6 cm. long; style 6--7 cm. long; leaf-blades very densely tomentellous or tomentose beneath.*C. speciosissimum*.
- 5b. Calyx in anthesis 10--12 mm. long; corolla-tube broad.....  
*C. horsfieldii*.
- 1a. Leaf-blades densely and conspicuously squamulose beneath.
6. Calyx in anthesis inflated, its lobes broadly ovate, basally overlapping, 10 mm. long or longer, 5--8 mm. wide.*C. bethunianum*.
- 6a. Calyx not inflated during anthesis, its lobes narrow, not basally overlapping.
7. Calyx-lobes during anthesis 2--3 mm. long
8. Leaf-blades puberulent.....*C. puberulum*.
- 8a. Leaf-blades glabrous or essentially so.....*C. intermedium*.
- 7a. Calyx-lobes during anthesis larger, 5 mm. long or longer.
9. Calyx-lobes during anthesis 5--8 mm. long.
10. Inflorescence-branches, pedicels, calyx, and corolla-tube glabrous or only very obscurely and minutely appressed-puberulent.
11. Corolla red or scarlet.....*C. kaempferi*.
- 11a. Corolla salmon-pink,.....*C. kaempferi* f. *salmonum*,
- 11b. Corolla white.....*C. kaempferi* f. *album*.
- 10a. Inflorescence-branches, pedicels, calyx, and corolla-tube conspicuously puberulent with spreading hairs.*C. urticifolium*.
- 9a. Calyx-lobes 10--15 mm. long during anthesis.....*C. japonicum*.
- Key 2 (based on Lam, 1919):
1. Inflorescence forming a very dense, club-shaped, many-bracted thyrse, 10--20 cm. long, 7--9 cm. wide; bracts foliaceous; corolla-tube 2.5--3 cm. long.....*C. rumphianum*.
- 1a. Inflorescence more or less loose.
2. Corolla-tube 1--1.5 cm. long.
3. Leaf-blades 3--7-lobed, the lobes large.....*C. paniculatum*.
- 3a. Leaf-blades not marginally lobed.
4. Leaf-blades basally deeply sinuate, the 2 lobes at the sides of the basal sinus covering each other; inflorescence and calyx scarlet.....*C. japonicum*.
- 4a. Leaf-blades basally more or less cordate, the 2 lobes at the sides of the sinus not covering each other.
5. Leaf-blades glabrous or with some thick hairs above; calyx about 6 mm. long and 5 mm. wide during anthesis, 8--15 mm. long

in fruit; leaf-blades marginally very minutely denticulate.....

*C. bethunianum.*

5a. Calyx in anthesis 2--5 mm. long and 3 mm. wide, in fruit 6--8 mm. long; leaf-blades marginally plainly denticulate with mucronulate teeth.....*C. intermedium.*

2a. Corolla-tube 2--3.6 cm. long.

6. Corolla-tube 2--2.5 cm. long.

7. Calyx 2.5--5 mm. long, pubescent; leaf-blades usually marginally coarsely dentate or undulate, the upper surface with some large hairs and few to many smaller ones, the lower surface tomentose.....*C. buchmanii.*

7a. Calyx 5--12 (mostly 8--12) mm. long.

8. Leaf-blades with sparse thick hairs above.....*C. kaempferi.*

8a. Leaf-blades not as above.

9. Leaf-blades completely glabrous above.....*C. illustre.*

9a. Leaf-blades tomentose on both surfaces.....*C. horsfieldii.*

6a. Corolla-tube 2.5--3.6 cm. long.

10. Calyx 2-lipped, 16 mm. long; stamens exerted 7 cm.; a glabrous shrub.....*C. utakwense.*

10a. Calyx regularly 5-toothed, not 2-lipped, 6--8 mm. long; stamens exerted 1.5 cm.; a pubescent shrub.....*C. speciosissimum.*

Key 3 [based on Syngé (1956) for species cultivated in England, the nomenclature brought up-to-date]:

1. Twiners.

2. Leaf-blades glabrous or nearly so.

3. Leaf-blades roundish-ovate.

4. Calyx in anthesis purplish, corolla deep-rose.....

*C. thomsonae* f. *speciosum.*

4a. Calyx white, corolla crimson.....*C. thomsonae.*

3a. Leaf-blades ovate-lanceolate; stems hollow.....

*C. capitatum* var. *cephalanthum.*

2a. Leaf-blades downy, ovate-cordate.....*C. umbellatum.*

1a. Plants erect.

5. Corolla white.

6. Leaf-blades to 10 cm. long.

7. Corolla-tube less than 2.5 cm. long.

8. Corolla-tube about 1.3 cm. long; leaves whorled...*C. glabrum.*

8a. Corolla-tube about 2 cm. long; leaves opposite...*C. tomentosum.*

7a. Corolla-tube 2.5 cm. long or longer.

9. Corolla-tube 2.5--3 cm. long; leaf-blades coarsely toothed...

*C. calamitosum.*

9a. Corolla-tube 10--11 cm. long; leaf-blades incised-lobed....

*C. incisum.*

6a. Leaf-blades more than 10 cm. long.

10. Leaf-blades mostly more than 20 cm. long.

11. Corolla-tube about 2.3 cm. long; leaf-blades ovate-cordate, not lobed.....*C. colebrookianum.*

11a. Corolla-tube 10--15 cm. long; leaf-blades hastate, 3--5-lobed.....*C. hastatum.*

10a. Leaf-blades rarely as much as 20 cm. long.

12. Young shoots pubescent.

13. Leaf-blades entire.
14. Calyx crimson; leaf-blades more or less pubescent beneath, not purple when young.
15. Leaf-blades lightly pubescent, mostly on the venation, beneath; young growth not densely pubescent. *C. trichotomum*.
- 15a. Leaf-blades very densely pubescent beneath; young growth densely ferruginous-tomentose.....  
*C. trichotomum* var. *ferrugineum*.
- 14a. Calyx green; leaf-blades purple when young, glabrous or subglabrate beneath; young growth not densely ferruginous-tomentose.....*C. trichotomum* var. *fargesii*.
- 13a. Leaf-blades marginally sinuate or dentate.
16. Leaf-blades coarsely dentate; inflorescence lateral.....  
*C. schweinfurthii* var. *bakeri*.
- 16a. Leaf-blades sinuate; inflorescence terminal..*C. sinuatum*.
- 12a. Young shoots glabrous.....*C. wallichii*.
- 5a. Corolla colored, not pure white.
17. Corolla cream-color or yellow.
18. Corolla cream, its tube to 12.5 cm. long.....*C. capitatum*.
- 18a. Corolla yellow, only to 2.5 cm. long.....*C. grandiflorum*.
- 17a. Corolla red to violet.
19. Corolla red or orange to rose or pink.
20. Leaf-blades mostly less than 15 cm. long.
21. Corolla scarlet.
22. Corolla-limb about 2.5 cm. wide.
23. Leaf-blades deeply lobed; corolla-tube about 1.2 cm. long; flowers in large terminal panicles.....*C. paniculatum*.
- 23a. Leaf-blades unlobed; corolla-tube 2 cm. long; flowers in corymbose clusters.....*C. splendens*.
- 22a. Corolla-limb 3.2--3.5 cm. wide.....  
*C. kaempferi*.
- 21a. Corolla rose or pink, "doubled".*C. philippinum* f. *multiplex*.
- 20a. Leaf-blades mostly over 15 cm. long.
24. Young shoots glabrous.
25. Stems mostly myrmecophilous; corolla bright-orange.....  
*C. phyllomega* var. *myrmecophilum*.
- 25a. Stems not myrmecophilous; corolla crimson or scarlet.
26. Corolla crimson; flowering calyx inflated, its lobes broadly ovate, basally overlapping; panicles to 90 cm. long and wide.....*C. bethunianum*.
- 26a. Corolla scarlet; flowering calyx not inflated, its lobes narrow, not overlapping; panicles to 25 cm. long and wide...  
*C. japonicum*.
- 24a. Young shoots densely appressed-puberulent.*C. speciosissimum*.
- 19a. Corolla purplish-red or violet to blue.
27. Corolla decidedly zygomorphic, purplish-red.....*C. bungei*.
- 27a. Corolla subactinomorphic, violet-blue.....*C. ugandense*.

Material of *C. bethunianum* has been widely misidentified and distributed in herbaria as the closely related "*C. intermedium* C. & S." and less widely as *C. colebrookianum* var. *forbesii* King & Gamble, *C. fallax* Lindl., *C. kaempferi* (Jacq.) Sieb., *C. squamatum* Vahl *C. squamatum* var. *japonicum* Hassk., *C. squamatum* var. *scopiferum* Lam,

and *C. trichotomum* Thunb. On the other hand, the *Elmer* 13641, *Kokawa & Hotta* 4822, *Robinson Philip. Bur. Sci.* 18113, and *Wenzel* 3292, distributed as *C. bethunianum*, actually are *C. intermedium* Cham., while *Usteri* s.n. and *Yates* 16 are *C. kaempferi* (Jacq.) Sieb.

Citations: MALAYA: Penang: *Burkill* 6139 (Bz--20717). PHILIPPINE ISLANDS: Balabac: *Mangubat Herb. Philip. Bur. Sci.* 383 (N, W--439609). Basilan: *J. V. Santos* 4193 (W--2246061). Bohol: *M. Ramos Herb. Philip. Bur. Sci.* 42597 (Ca--242448). Catanduanes: *M. Ramos Herb. Philip. Bur. Sci.* 30263 (Bz--20716, W--1375167); *Ramos & Edaño Herb. Philip. Bur. Sci.* 75124 (N). Cebu: *R. C. McGregor Herb. Philip. Bur. Sci.* 1725 (W--439286). Cebu: *Kienholz* s.n. [June 1923] (Ca--262816); *Ramos & Edaño Herb. Philip. Bur. Sci.* 44453 (Bz--20714, Ca--257649, K, Ld--photo, N, N, N--photo). Luzon: *Bawan & Borromeo Herb. Philip. For. Bur.* 24284 (W--1376044); *Edaño Herb. Philip. Bur. Sci.* 26959 (W--1376043); *Elmer* 6678 (N), 14504 (Bi, Bz--20623, N, W--1236129); *E. D. Merrill* 3153 (W--438125); *R. Meyer Herb. Philip. For. Bur.* 2177 (N, W--439836); *L. Née* 16 (Q), 22 (Q), 24 (Q); *F. L. Stevens* 481 (Ur); *R. S. Williams* 15 (N, N, N). Mindanao: *Ebalo* 1126 (Mi); *Kanehira* 2628 (N); *Mearns* 23 (W--447411), 24 (W--447412); *Ramos & Edaño Herb. Philip. Bur. Sci.* 39076 (Bz--20626), 49611 (Ca--323850); *Wenzel* 3992 (Ms); *R. S. Williams* 2175 (N, N), 2584 in part (N). Mindoro: *Edaño Philip. Nat. Herb.* 3524 (Mi); *R. C. McGregor* 221 (N, W--854986). Negros: *Elmer* 9763 (L, N, Vt, W--705625). Palawan: *Ebalo* 371 (Mi); *Elmer* 12649 (Bi, Bz--20715, L, N, Ut--29124, W--894529); *Foxworthy Herb. Philip. Bur. Sci.* 786 (Bz--20627, N, W--627155). Samar: *Edaño Herb. Philip. Bur. Sci.* 24845 (W--897972). Island undetermined: *Agor* 3 [Sarrat, Ilocos Norte] (Ln--169504); *Herb. Philip. Bur. Sci.* s.n. (Gg--32020). GREATER SUNDA ISLANDS: Kalimantan: *Amdjah* 96 (Bz--20711), 374 (Bz--20708), 421 [Hallier 1218] (Bz--20709, Bz--20710, K, Ut--80797); *Endert* 2099 (Bz--72721), 2364 (Bz--72723); *H. Hallier B.1539* (Bz--20713), *B.3090* (Bz--20712); *Rutten* 126 (Ut--16994, Ut--22622); *Slooten* 2165 (Bz--20599); *Teijsmann* 8502 (Bz--20600, Bz--20601). Sabah: *Aban G. SAN.94568* (Ld); *Abas SAN.85902* (Sn--56463); *Dewol Sundaling SAN.97330* (Ld); *Fedilis & Sumbing SAN.95685* (Ld); *M. Fraser* 269 (K, Ld--photo, N--photo); *Grooteboom* 1286 (Sn--118534, W--2972940); *Kadir A.* 2008 (W--2187120); *Madani & Saigol SAN.92537* (Ld); *Sigin & al.* SAN.99770 (Ld), SAN.99800 (Ld); *Villamil* 128 (W--1376807). Sarawak: *Clemens & Clemens* 20641 [field no. 7554] (Bz--20596, N), 21782 [field no. 5594] (Bz--20595, N); *Hose* 88 (Ph); *Native collector s.n.* [Balaga 4.8.27] (Ca--357345). Sumatra: *Van Steenis* 6188 (Bz--20684). Talaud: *Lam* 2699 (Bz--20667). CULTIVATED: England: *Herb. Hooker* s.n. (K, K, K).

*CLERODENDRUM BINGAENSE* S. Moore, Journ. Bot. Brit. 57: 248--249 [as "*Clerodendron*"]. 1919; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 39, 68, & 92. 1936.

Synonymy: *Clerodendron bingaense* S. Moore, Journ. Bot. Brit. 57: 248. 1919.

Bibliography: S. Moore, Journ. Bot. Brit. 57: 248--249. 1919; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 39, 68, & 92. 1936; Mold., Known Geogr. Distrib.

Verbenac., ed. 1, 47, 48, & 89 (1942) and ed. 2, 115 & 180 (1949); Mold., Résumé 141 & 448. 1959; Mold., Fifth Summ. 1: 228 (1971) and 2: 862. 1971; Mold., Phytol. Mem. 2: 218 & 534. 1980.

A shrub; branches sparsely foliose, pubescent; leaves small, decussate-opposite; petioles 6--10 mm. long, pubescent; leaf-blades thin-membranous, ovate, 3--5 cm. long, 2--4 cm. wide, green even when dried, apically obtuse, marginally crenate-dentate (the teeth mostly 1--1.5 mm. high), basally obtuse, glabrous above, sparsely pubescent on the venation beneath; inflorescence like that of *C. consors* S. Moore, to 10 cm. long and 6 cm. wide, loose, bracteate, the "floral leaves" ovate-oblong or oblong, about 2 cm. long, marginally entire or subentire; bracts linear, 1--2 mm. long; pedicels shorter than the calyx, pubescent; calyx 6--7 mm. long, about 2 mm. wide, externally pubescent, the tube cylindric, 3 times as long as the lobes, the lobes deltoid, 2 mm. long, apically acute; corolla 18 mm. long, 3 times as long as the calyx, the tube narrow, centrally 1 mm. wide, basally 1.5 mm. wide, apically 2.5 mm. wide, externally glabrous, the lobes 3.5 mm. long and 3 mm. wide; stamens exerted to about 7 mm.

This species is based on *Kassner 2627* from under trees at Binga, Zaire, probably deposited in the herbarium of the British Museum. Moore (1919) avers that it differs from *C. lukapense* [= *C. consors*] "chiefly in foliage and corolla". Nothing else is known to me of this taxon.

*CLERODENDRUM BIPINDENSE* Gürke, Engl. Bot. Jahrb. 28: 296--297 [as "*Clerodendron*"]. 1900; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 41, 72, & 92. 1936.

Synonym: *Clerodendron bipindense* Gürke, Engl. Bot. Jahrb. 28: 296. 1900.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 516. 1900; Gürke, Engl. Bot. Jahrb. 28: 296--298. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 495. 1900; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904; Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 1, 2: 268 & 272--275. 1931; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 8, 9, 16, 41, 72, & 92. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 48 & 89. 1942; Mold., Alph. List Cit. 1: 162 (1946), 2: 504 (1948), 3: 828 (1949), and 4: 1153 & 1241. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 113, 114, & 180. 1949; Mold., Résumé 138, 139, 141, 260, & 448. 1959; Mold., Résumé Suppl. 4: 6. 1962; H. Huber in Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 2, 2: 440 & 444. 1963; Mold., Fifth Summ. 1: 228 (1971) and 2: 862. 1971; Mold., Phytol. Mem. 2: 218 & 534. 1980.

A climbing shrub or slender liana, to 7 m. long, cauliflorous, spinescent; branches and branchlets slender, terete, glabrous; leaves decussate-opposite, short-petiolate; petioles 1--2 cm. long, jointed somewhat below the middle, the lower portion remaining after the leaf is shed, becoming woody, very divergent, and strong (in spite of its thin diameter) and assisting the plant in climbing, glabrous; leaf-blades membranous, elliptic or oblong, 10--20 cm. long, 4--8 cm. wide, apically long-acuminate or cuspidate, marginally entire,

basally rounded or broadly cuneate and slightly prolonged into the petiole, green and glabrous on both surfaces; inflorescence axillary but produced on the leafless spiny portion of the stems often near the ground, cymose, the cymes pedunculate, very ample, much branched, lax (often very much so), the cyme-branches very slender, thin and finely downy; pedicels elongate, the ultimate ones 0.5--2 cm. long; bractlets setaceous or filiform, about 2 mm. long; calyx broadly campanulate or cupuliform, 3--4 mm. long, apically 5-toothed, basally gradually narrowed into the pedicel, externally glabrous, the teeth broadly deltoid, about 1 mm. long, apically shortly acuminate; corolla yellow or yellowish, yellowish-white, or cream-color, 2.2--2.5 cm. long, the tube rather straight, 1.5--2 cm. long, about 1 mm. wide when dried, externally sparsely puberulent or finely pubescent, the limb 1/4 to 1/5 the length of the tube, the lobes small, obovate, apically obtuse; style twice as long as the corolla-tube; fruit drupeaceous, separating into 4 nutlets on maturity.

The species is based on *Dinklage* 288 from the Ebea Rocks, Cameroons, collected on November 20, 1889, *Dinklage* 1367 from moist soil in the forest near Batanga, collected October 5, 1891, *Preuss* 1358 from light primary forest north of Victoria, collected November 22, 1894, and *Zenker* 1217 from a shady primary forest at Bipinde, collected on December 16, 1896, all originally deposited in the Berlin herbarium, now destroyed. Of these collections, Thomas (1936) has designated *Preuss* 1358 as the type.

Collectors have found *C. bipindense* growing in mostly primary rain-forests, at 100 m. altitude, in flower from October to December, and in fruit in January. Gürke (1900) remarks that "Diese neue Art zeigt charakteristische Merkmale und ist von allen bisher bekannten besonders durch ihren lockeren Blütenstand sehr verschieden; nur *Cl. yaundense* Gürke kommt ihr darin gleich und allenfalls noch *Cl. melanocrater* Gürke, deren Rispen aber bei weitem nicht diese langen, schlanken und weit sparrenden Verzweigungen zeigen, wie es hier der Fall ist. Dazu kommt der lianenartigen Wuchs und die lang zugespitzten Blätter, die sie ebenfalls als deutlich zu unterscheidende Art charakterisieren."

Baker (1900) cites only the original cotype collections. Thomas (1936) cites *Bllsger* 139 & 496, *Dinklage* 288 & 1367, *Escherich* 128, *Ledermann* 291 & 1345, *Mildbraed* 4121 & 10706, *Zahn* 252, and *Zenker* 1217, 3581, & 3837, all from the Cameroons. Huber (1963) cites *Keay* FHI.28182 and *Talbot* 1530 & 2058 from southern Nigeria, *Binuyo* & *Daramola* FHI.35082, *Maitland* 783, *Mildbraed* 10706, and *Preuss* 1358 from Cameroons, and *Mann* 71 from Fernando Po.

The *Germain* 5303 collection, cited below, is anomalous and is placed here tentatively. The *Zenker* 3581 collection is a mixture with something non-verbenaceous.

Citations: LIBERIA: *Straub* 255 (W--946193). CAMEROONS: *Bllsger* 139 (B); *Zenker* 1217 (L), 3581 in part (W--953989), 3837 (B, Br, L, Mu--4114, N, W--554265), s.n. [Bipindi, December 1908] (Ca--620044), s.n. [Bipindi] (Ca--619702, Du--237446, Gg--245946, Ld--photo, N, N--photo). ZAIRE: *Briey* s.n. [1913] (Br); *Germain* 5303 (E--1928195).

*CLERODENDRUM BOIVINII* Mold., Bull. Torrey Bot. Club 77: 394. 1950.

Synonymy: *Clerodendron asperatum* Boivin ex Mold. in Humbert, Fl. Madag. 174: 238 in syn. 1956.

Bibliography: Mold., Bull. Torrey Bot. Club 77: 394. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 56. 1953; Mold. in Humbert, Fl. Madag. 174: 155, 235, 237--238, & 267, fig. 38 (6--8). 1956; Mold., Résumé 155, 260, & 448. 1959; Mold., Fifth Summ. 1: 259 & 439 (1971) and 2: 862. 1971; Mold., Phytol. Mem. 2: 248 & 534. 1980.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 235, fig. 38 (6--8). 1956.

A shrub, to 2 m. tall, abundantly branched and twiggy; branches medium-slender, gray, prominently lenticellate, subterete, glabrate; branchlets quite slender, very light-gray, lenticellate, sometimes ternate, glabrescent; twigs very slender, densely white-puberulent with very short, closely appressed, antrorse hairs, or on the younger parts the hairs more divergent, sometimes only minutely puberulous; leaves normally decussate-opposite, small, often rather numerous; petioles very slender, 4--12 mm. long, finely puberulent or strigillose; leaf-blades submembranous, rather uniformly grayish-green on both surfaces, elliptic or slightly ovate, 0.5--8 cm. long, 0.6--3.2 cm. wide, apically obtuse or very shortly acuminate (with the actual point very blunt), marginally entire, basally acute or subacute, glabrous or subglabrate on both surfaces, densely punctate beneath; midrib very slender, mostly flat above, only slightly prominulous beneath; secondaries very slender or filiform, 3--5 per side, mostly obscure on both surfaces or only very slightly subprominent beneath, arcuate-ascending, not plainly joined; vein and veinlet reticulation indiscernible on both surfaces; inflorescence axillary and terminal, mostly limited to the apex of the twigs, cymose, usually loosely many-flowered, 3--7 cm. long, 4--10 cm. wide; peduncles very slender, 2--2.5 cm. long or occasionally obsolete, more or less puberulent; cyme-branches very slender or subfiliform, mostly elongate and divaricate, puberulent; pedicels filiform, 2--6 mm. long, puberulent or strigillose; calyx campanulate, about 2 mm. long, 1.5--2 mm. wide, externally minutely puberulent or strigillose, its rim truncate, entire or subentire; corolla white or rose-tinted, hypocrateriform, its tube very narrowly cylindrical, usually 9--12 mm. long, rarely to 17 mm. long, externally minutely pulverulent or glabrate, its limb 4--7 mm. wide; stamens and pistil exerted about 7 mm. from the corolla-mouth; fruiting pedicels filiform, to 11 mm. long, glabrescent; fruiting-calyx shallowly cupuliform, about 3 mm. long, 6--7 mm. wide, venose, externally minutely puberulent or glabrescent, its rim truncate and entire; fruit drupaceous, subglobose, nigrescent in drying, about 7 mm. long and wide, externally glabrate.

This endemic species is based on *Boivin 2483* from along the seashore at the edge of woods at Port Lewen, Madagascar, collected in April, 1849, and deposited in the Paris herbarium.

Collectors report finding the species along seashores, on dunes or gneiss outcrops, and at the edge of woods, in flower in January. *Decary 9555* is the only collection which indicates on its accompanying label the coloration of the flowers. This and the other Decary collection cited below are atypical, having smaller leaves, denser



inflorescences, and more strigillose (rather than puberulent) hairs in the inflorescences. They may represent a distinct taxon or else a natural hybrid between *C. boivini* and *C. emirnense* Bojer.

For a key to distinguish *C. boivini* from the other known Madagascar taxa in this genus, see under *C. baronianum* Oliv. in this series of notes.

Citations: MADAGASCAR: Bernier 86 (P), 333 (P), s.n. (P); Boivin 2483 (P--type); Decary 9082 (P), 9555 (N, P); Perrier 10252 (P); Vesco s.n. [Port-Leven 1850] (P, P).

*CLERODENDRUM BOSSERI* Capuron, *Adansonia*, ser. 2, 12: [45]--48, pl. 1. 1972.

Synonymy: *Clerodendron bosseri* Cap. apud Anon., *Assoc. Étud. Tax. Fl. Afr. Trop. Ind.* 1972: 56. 1973.

Bibliography: Capuron, *Adansonia*, ser. 2, 12: [45]--48, pl. 1. 1972; Anon., *Assoc. Étud. Tax. Fl. Afr. Trop. Ind.* 1972: 56. 1973; Mold., *Phytologia* 31: 389. 1975; Mold., *Phytol. Mem.* 2: 248 & 534. 1980; Brenan, *Ind. Kew. Suppl.* 16: 71. 1981.

Illustrations: Capuron, *Adansonia*, ser. 2, 12: 46, pl. 1. 1972.

A tree, 10--15 m. tall, pubescent with uniseriably branched hairs over almost all parts; bark yellowish, longitudinally fissured; leaf-bearing branches stout, 5--10 mm. in diameter, compressed at the nodes, pubescent with short, yellowish-brown, branched hairs; nodes without circumferential lines of hairs connecting the petiole-bases; leaf-scars conspicuous; leaves decussate-opposite; petioles cylindrical in cross-section, 3--9.5 cm. long, canaliculate above; leaf-blades membranous, broadly ovate, 9--21 cm. long, 6.5--15 cm. wide, apically obtusely attenuate and often shortly acuminate, marginally entire, basally rounded or often cordate (the central portion shortly prolonged into the petiole), densely pilose above with rather short, stout, 2--5-branched hairs longer than those on the branches, softly pilose beneath with the hairs longer, more slender, denser, and more branched than those on the upper surface, sparsely glandulose on both surfaces with multicellular peltate glands visible only under a hand lens; midrib flat or slightly impressed above, very prominent beneath; secondaries 5 or 6 pairs (of which one pair is basal or almost basal), slightly prominulous above, more prominent beneath; tertiaries quite visible beneath; inflorescence terminal or in the upper leaf-axils, paniculate, ample, to 30 cm. long, loosely flowered, the cymes dichotomous; bracts and bractlets narrowly triangular, the upper ones minute, 1--2 mm. long, the lower ones to 10 mm. long and 1 mm. wide; pedicels slender, 1--2 mm. long; flowers odorous; calyx green, externally pubescent, the tube campanulate-cylindric, 4--4.5 mm. long, internally glandulose with very numerous peltate glands, the 5 lobes ovate-triangular, 4--4.5 mm. long, internally glabrous and eglandulose, valvate in bud, later spreading; corolla white, slender, externally glabrous in all parts, the tube subcylindric, apically somewhat ampliate, 3--3.5 cm. long, internally (especially below the stamen insertion) rather densely pubescent with short cylindric hairs which are apically rounded, often 1-cellular, rarely 2-cellular; corolla-lobes slightly unequal, obovate, to 20 mm. long and 12 mm. wide, concave, patulous; stamens

equal or slightly unequal, to 35 mm. long, inserted at the middle of the corolla-tube; style slender, greatly exerted, about 5 cm. long, glabrous; stigma shortly and unequally bifid; ovary subcylindric, to 2.5 mm. long and wide, apically somewhat 4-lobulate, glabrous throughout, imperfectly 4-celled, mostly 1-celled; disk absent; fruiting-calyx partly enclosing the base of the fruit; mature fruit not seen.

This species, known to me only from the original description and its small bibliography, is based on *R. Capuron 29198* from a shady woods, 950--1000 m. altitude, south of Mt. Ambre in the neighborhood of Andasibe, in Upper Sahalalina, Madagascar, deposited in the Paris herbarium.

Capuron (1972) comments that "Cette belle espèce de *Clerodendrum*, qui semble appartenir à la Section [*P*]aniculata Schau. de sous-genre *Clerodendrum*, nous paraît surtout caractérisée par sa pubescence constituée par des poils unisériés et, pour la très grande majorité d'entre eux, ramifié. Ces poils hérissent pratiquement toutes les parties de la plante; courts sur les rameaux, les pétioles, les axes de l'inflorescence et la face externe du calice ils sont nettement plus longs sur les faces du limbe foliaire et surtout à la face inférieure de celui-ci (sur cette face, les poils sont plus longs, plus grêles et plus ramifiés qu'à la face supérieure); des glands peltées, très petites et visibles seulement sous un assez fort grossissement, parsèment les deux faces du limbe, surtout l'inférieure; c'est sur cette dernière face que sont localisés les stomates, du type renonculacé (les cellules de l'épiderme ont des parois très sinueuses)... Dans la Flore de Madagascar... sa clé des espèces la *C. bosseri* vient se placer près des *C. buchani* Walp. var. *fallax* (Lindl.) Bak., *C. speciosissimum* Van Geert et *C. villosum* Bl., toute espèces étrangères à la Grand Ile et qui, si elles y existent y ont été introduites pour l'ornement. Le *C. bosseri* se distingue de ces trois espèces par divers caractères, en particulier ceux de sa pubescence."

Citations: MOUNTED ILLUSTRATIONS: Capuron, *Adansonia*, ser. 2, 12: 46, pl. 1. 1972 (Ld).

*CLERODENDRUM BOTRYODES* (Hiern) J. G. Baker in Thiselt.-Dyer, Fl.

Trop. Afr. 5: 516 [as "*Clerodendron*"]. 1900; B. Thomas, Engl.

Bot. Jahrb. 68: [Gatt. *Clerod.*] 70 [as "Baker"]. 1936.

Synonymy: *Siphonanthus botryodes* Hiern, Cat. Afr. Pl. Coll.

Welw. 1: 843--844. 1900. *Clerodendron botryodes* J. G. Baker in

Thiselt.-Dyer, Fl. Trop. Afr. 5: 516. 1900. *Clerodendron botryoides* (Hiern) K. Schum., Justs Bot. Jahresber. 28 (1): 496. 1900.

*Siphonanthus botryoides* Hiern apud K. Schum., Justs Bot. Jahresber.

28 (1): 496 in syn. 1900. *Clerodendron botryoides* Baker apud

Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904. *Clerodendron botryoides*

K. Schum. apud Prain, Ind. Kew. Suppl. 3: 44. 1908. *Clerodendron*

*goossensii* DeWild., Bull. Jard. Bot. Brux. 7: 168--169. 1920.

*Clerodendron goossensii* DeWild. apud A. W. Hill, Ind. Kew. Suppl. 6:

49. 1926. *Clerodendron goossense* DeWild. apud Pellegrin, Mém. Soc.

Linn. Normand., ser. 2, Bot. 1 (3): 50. 1928. *Clerodendron*

*botryodes* (Hiern) Baker ex Good & Exell, Journ. Bot. Brit. 68, Suppl.

2: 140. 1930. *Clerodendrum goossensii* (DeWild.) apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 70 in syn. 1936. *Clerodendrum botryodes* K. Schumach. apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 92 in syn. 1936. *Clerodendrum botryodes* Baker apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 70. 1936. *Clerodendron botryodes* K. Schum. ex Mold., Alph. List Inv. Names 16 in syn. 1942. *Siphonanthus botryodes* (Baker) Hiern ex Mold., Phytol. Mem. 2: 437 in syn. 1980.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 516. ;900; Hiern, Cat. Afr. Pl. Coll. Welw. 1: 843--844. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 496. 1900; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43 & 172. 1904; Prain, Ind. Kew. Suppl. 3: 44. 1908; De Wild., Bull. Jard. Bot. Brux. 7: 168--169. 1920; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; Fedde & Schust., Justs Bot. Jahresber. 48 (1): 497. 1927; Pellegrin, Mem. Soc. Linn. Normand. Bot. 26 [ser. 2, 1 (3)]: 50. 1928; Good & Exell, Journ. Bot. Brit. 68, Suppl. 2: 140. 1930; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 8, 9, 13, 16, 41, 70, & 92. 1936; Mold., Alph. List Inv. Names 16, 17, & 40. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 48, 50, & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 61. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 115, 118, & 180. 1949; Mold., Résumé 137, 140, 141, 146, 260, 263, 344, & 448. 1959; Mold., Résumé Suppl. 9: 3. 1964; Mold., Fifth Summ. 1: 220, 226, 228, 242, 440, & 446 (1971) and 2: 621 & 862. 1971; Mold., Phytologia 28: 442. 1974; Mold., Phytol. Mem. 2: 209, 210, 217, 218, 232, 437, & 534. 1980.

A low, rhizomatous, evergreen, usually cauliflorous shrub or liana, 1--3 m. tall, with the aspect of a *Musanga*, glabrous, sarmentose, not prone to give off branches; stems very conspicuously spiny; leaves decussate-opposite [or alternate acc. Baker], distinctly petiolate; leaf-blades mostly leathery, oblong, 7.5--30 cm. long, 4--13 cm. wide, apically acuminate, marginally entire or slightly toothed, basally rounded or subcordate, glabrous on both surfaces; vein and veinlet reticulation mostly flat above; inflorescence congested, often subcapitate, borne on the old portions of the stems at or near their base or arising from the rhizome from among forest litter, sometimes also borne at the tips of the branches [acc. Goossens], the panicles oblong, 5--20 cm. long, their branches pubescent; pedicels 1--2 mm. long; calyx campanulate-oblong, 5--12 mm. long, nigrescent, externally glandular-pubescent, its lobes deltoid, apically acute; corolla white, 1.2--2 cm. long, the lobes obovate, subequal, about 4 mm. long.

The species is based on *Welwitsch 5662* from Angola, deposited in the Kew herbarium, the type having been designated by Thomas (1936), who cites also *Welwitsch 5714* from the same country and *Goossens 1204* from Zaire. Baker (1900) cites *Welwitsch 5662*, *5711*, & *5714* from Angola, while Good & Exell (1930) cite from the same country *Gossweiler 4807a*, *4808*, *5232*, & *5779*. Pellegrin (1928) records the species from the Republic of Guinea.

*Clerodendron goossensii* was based by DeWildeman (1920) on *Goossens 1151* [Fedde & Schuster (1927) say "n. 115"] and *1204* from Ganda-Sundi, Zaire, collected in July and August, 1919, and deposited in the Brussels herbarium. DeWildeman says of it: "Cette plante nous

montre, comme le fait remarquer M. V. Goossens dans ses notes, une très grande variété dans la forme et la disposition de ses inflorescences; nous pourrions également ajouter une très grande variété dans la disposition des feuilles et dans leur nature, en particulier dans celle du pétiole articulé à des niveaux très différents, laissant après la chute du limbe et de son pétiole un moignon de longueur variable plus ou moins fortement recourbé en crochet. Bien que signalé comme arbrisseau, il semblerait que la plante puisse devenir grimpante, comme beaucoup d'autres de ses congénères. On doit donc considérer cette espèce nouvelle comme un *Ey-Clerodendron*, appartenant au groupe à cymes non franchement capitées et à feuilles ovales. Elle se range des lors dans le voisinage du *C. Thonneri*, dont elle se différencie par ses feuilles nettement ovales plus étroites vers le sommet que vers la base."

Hiern (1900) states that his *Siphonanthus botryodes*, proposed as a new species with an adequate description, was based by him on a Baker manuscript name; Baker, however, in the same year gives Hiern's binomial and its correct bibliographic citation in his original re-description of the species. It seems obvious, therefore, that the accepted binomial for the species should be written with the double authorship as I have given it in this paper and as it was given also by Good & Exell in their 1930 paper.

*Clerodendrum botryodes* has been encountered by collectors in moist sandy woods, at 340--350 m. altitude, and flower in May and from August to October, and in fruit in October and December. The vernacular names "mududidudé" and "mundidudi" have been reported for it, as well as "ligne de crête" and "n'kula-n'kakala" by Toussaint, who comments that it is a "liane a crochets s'epanouissant sur un *Musanga*; inflorescences en grappe, de fleurs blanches, naissent su pied de la liane, sur une anse a même le sol, les inflorescences emergeant de la litiere de feuilles mortes". The corolla color is also given as white on Baldwin 7082, Gossweiler 4807a, and LeTestu 1034. Pellegrin (1928) cites LeTestu 1034 from "Coteaux pierreux siliceux forestiers" in Guinea.

Material of *C. botryodes* has been misidentified and distributed in some herbaria as *C. buchholzii* Gürke.

The species may be distinguished from some of its closest relatives as follows:

1. Leaf-blades marginally mostly entire.
2. Leaf-blades mostly leathery, glabrous; stems and branches very conspicuously long-spiny.
3. Inflorescence congested, often subcapitate; calyx nigrescent; veinlet reticulation mostly flat above.....*C. botryodes*.
- 3a. Inflorescence very loose; calyx stramineous, not nigrescent; veinlet reticulation mostly prominent on both leafblade surfaces.....*C. laxicyosum*.
- 2a. Leaf-blades mostly submembranous; branches usually not conspicuously spiny.....*C. thonneri*.
- 1a. Leaf-blades marginally more or less dentate. *C. tanganyikense* and its varieties.

Citations: LIBERIA: J. T. Baldwin 7082 (W--2672753). GHANA: Vigne

3386 (N). ZAIRE: Flamigni 12 (Br, Br, Br, N); Germain 8113 (E--2168595); Goossens 1151 (Br, Ld--photo, N, N--photo), 1204 (Br, N); Hendricks 764 (Br); Nannan 204 (Br, Br, N); Pynaert 333 (Br); Tous-saint 2458 (Br). ANGOLA: Gossweiler 4807a (Br).

*CLERODENDRUM BRACHYANTHUM* Schau. in A. DC., Prodr. 11: 668 [as "*Clerodendron*"]. 1847; Mold., Alph. List Comm. Vern. Names 14, 17, 19, 20, 27, & 29. 1939.

Synonymy: *Clerodendron brachyanthum* Schau. in A. DC., Prodr. 11: 668. 1847. *Clerodendron brachyanthemum* Schau. ex Usteri, Beitr. Ken. Philip. Veg. 123 sphalm. 1905.

Bibliography: Schau. in A. DC., Prodr. 11: 668. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 105. 1858; Miq., Fl. Ned. Ind. 2: 878. 1858; Naves & Fern.-Villar in Blanco, Fl. Filip., ed. 3, 4: Nov. App. 161. 1880; Vidal y Soler, Phan. Cuming. Philip. 21 & 135. 1885; Vidal y Soler, Rev. Pl. Vasc. Filip. 211. 1886; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1895; K. Schum. & Lauterb., Nachtr. Fl. Deutsch. Südsee 372. 1905; Usteri, Beitr. Ken. Philip. Veg. 123. 1905; E. D. Merr., Philip. Journ. Sci. Bot. 7: 98. 1912; H. J. Lam, Verbenac. Malay. Arch. 291 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 76, 89--90, 108, & viii. 1921; E. D. Merr., Enum. Philip. Flow. Pl. 3: 400. 1923; Bakh. in Bakh. & Lam, Nova Guinea, ser. 1, 14, Bot. 1: 170--171. 1924; Mold., Alph. List Comm. Vern. Names 14, 17, 19, 20, 27, & 29. 1939; Mold., Prelim. Alph. List Inv. Names 18. 1940; Mold., Alph. List Inv. Names 16. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62, 67, & 68. 1942; Mold., Phytologia 2: 98. 1945; Mold., Alph. List Cit. 1: 5, 136, & 191 (1946), 2: 407, 462, 463, & 466 (1948), and 3: 765, 840, & 858. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 141, 149, & 180. 1949; Mold., Résumé 183, 194, 198, 200, 260, & 448. 1959; Mold., Résumé Suppl. 3: 21 (1962) and 10: 4. 1964; Mold., Fifth Summ. 1: 315, 321, 331, 335, & 440 (1971) and 2: 862. 1971; Mold., Phytol. Mem. 2: 306, 312, 322, 325, & 534. 1980.

A shrub or tree, to 8 m. tall; trunk to 20 cm. in diameter at breast height; branchlets tetragonal, sulcate, incanous-tomentose; leaves decussate-opposite, very large, the upper usually gradually diminishing in size, the uppermost subtending the lowest cymes much reduced; petioles about 8 cm. long, incanous-tomentose; leaf-blades dull dark-green above, cordate-ovate or subrotund, about 23 cm. long, basally 15 cm. wide, apically acuminate, marginally entire, basally cordate, hirtous on both surfaces, the vein reticulation incanous-tomentose; inflorescence terminal, paniculate, subfastigiate, loosely spreading, incanous-tomentose; bracts and bractlets foliaceous, small, lanceolate, the subfloral ones colored, the lowermost cymes often axillary; flowers fragrant; calyx campanulate, pedicellate, rather ample, 8 mm. long, green, the rim 5-dentate or -lobed, the lobes ovate, colored, glabrate, apically acute; corolla white or whitish to rose, often basally purple, the tube cylindric, about as long as the calyx, pilose, the limb short, the lobes subequal, glistening-silvery on the upper surface; stamens about twice as long as the corolla-

tube; anthers purple; fruiting-calyx red or purple; fruit drupaceous, black.

The species is based on *Cuming 816* from somewhere in the Philippine Islands.

Collectors have found the plant growing in forests and secondary forests and along roadsides, at 1530--1665 m. altitude, in flower from April to October and in December, and in fruit from May to July, September, and October. Sinclair & Edaño describe it as "common" in Luzon.

The corollas are said to have been "white" on Carr 13990 and Nyman 831, "whitish" on Kjellberg 1817, "white, purple at base" on Sinclair & Edaño 9558, and "rose" on Loher 4420. Loher asserts that his no. 4422 "=Vidal 1650"; Carr asserts that his no. 15156 is the "fruit of 15155".

Vernacular names reported for this species are "espangil", "hamindang", "kayomkom", "lusib", "mangha", "samanpait", and "talabogting".

Vidal (1885) cites only *Cuming 816* from the Philippines, while Merrill (1923) records it, without citing any specimens, from the islands of Catanduanes, Leyte, Luzon, Mindanao, Mindoro, and Polillo, "chiefly in secondary forests at low and medium altitudes [where it is] often common [and] Endemic." Schumann (1905) cites *Nyman 831* from Sabah. Fernandez-Villar (1880) cites only *Cuming 816* and lists the plant only from Luzon.

Material of *C. brachyanthum* has been misidentified and distributed in some herbaria as *C. buruanum* Miq., *C. macrostegium* Schau., and *C. villosum* Blume. On the other hand, the Herb. Philip. Bur. Sci. 48723, Herb. Philip. For. Bur. 450, and Merrill 1244 & 1280, distributed as *C. brachyanthum*, actually are *C. macrostegium* Schau., while Loher 12149 is *C. vanoverberghii* Merr.

Citations: PHILIPPINE ISLANDS: Alabat: Ramos & Edaño Herb. Philip. Bur. Sci. 43016 (Ca--321960), 48016 (N). Camiguin: Edaño Herb. Philip. Bur. Sci. 79296 (Bz--18734). Catanduanes: M. Ramos Herb. Philip. Bur. Sci. 30281 (Bz--18732); Ramos & Edaño Herb. Philip. Bur. Sci. 75272 (Ca--449254, N). Leyte: Wenzel 858 (W--902093). Luzon: Aguilar Herb. Philip. For. Bur. 20165 (W--568335); Ahern' collector Herb. Philip. For. Bur. 2193 (Bz--18731, N, Po--63533, W--627122); Bartlett 14917 (Mi); H. M. Curran Herb. Philip. For. Bur. 10852 (Bi); 10873 (W--628715); Curran & Merritt Herb. Philip. For. Bur. 8052 (Bz--18743); Edaño Herb. Philip. Bur. Sci. 76132 (Mi, N); Elmer 7486 (Bz--18741, L), 9117 (Bz--18724, L, N, Vt, W--705113), 13824 (W--1172319), 16164 (Bi, Bz--18740, Ca--271038, N, S, Ut--71927, W--1236664), 17732 (Bi, Bz--18738, Ca--271433, N, Ut--67250, W--1237293); Loher 4420 (Mu), 12452 (Bz--18728, Mu--434), 12921 (Ca--240579); Mendoza Philip. Nat. Herb. 18429 (W--2214750); R. C. Mc Gregor Herb. Philip. Bur. Sci. 22856 (W--898257); E. D. Merrill 2292 (W--437239), 2435 (W--437392); Ocampo Herb. Philip. Bur. Sci. 27928 (W--1376370); Oro 233 [Herb. Philip. For. Bur. 30867] (N); M. Ramos Herb. Philip. Bur. Sci. 1534 (Bz--18729, N), 2644 (Bi, L), 10940 (W--714527), 23392 (Bi, Bz--18744, W--1239088); Ramos & Edaño Herb. Philip. Bur. Sci. 45305 (Bz--18735, Ca--308597, N); Rivera & Duyag Herb. Philip. Bur. Sci. 49950 (Ca--359335, Ka--92552); Sinclair 9558

(W--2946377, W--2946378); *Sinclair & Edaño* 9558 (N). Mindanao: *Elmer* 13824 (Bi, Bz--18730, L, Mi, N, Ut--33525), s.n. [Cabadbaran, Sept. 1912] (Ca--272074); *Ramos & Edaño* Herb. Philip. Bur. Sci. 39056 (Bz--18736, Bz--18737, N). Mindoro: *Bartlett* 13540 (Mi); *E. D. Merrill* 2406 (W--437363, W--437364). Polillo: *C. B. Robinson* Herb. Philip. Bur. Sci. 9271 (Bz--18745). Samar: *R. G. McGregor* 6846 (Ca--2566671). Island undetermined: *Cuming* 816 (Ca--isotype, L--isotype, L--isotype, Mu--13920--isotype, X--isotype); *L. Née* 5 (Q). GREATER SUNDA ISLANDS: Celebes: *Kjellberg* 1817 (Bz--18746, S), 2956 (Bz--18747, S); *Rachmat* 197a (Bz--20887). MOLUCCA ISLANDS: Mangole: *Atje* s.n. [Hulstijn 245] (Bz--20884, Bz--20885). Soelabesi: *Atje* s.n. [Hulstijn 328] (Bz--20882, Bz--20883). NEW GUINEA: Papua: *Carr* 13990 (N), 15156 (N), 15158 (N). West Irian: *Thomsen* 707 (Bz--18726, Bz--18727).

*CLERODENDRUM BRACTEATUM* Wall., Numer. List [49], no. 1800 [as "*Clerodendron*"]. 1829; Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; Walp., Repert. Bot. Syst. 4: 106 [as "*Clerodendron*"]. 1845.

Synonymy: *Clerodendron bracteatum* Wall., Numer. List [49], no. 1800. 1829. *Clerodendrum* Griff., Itin. Notes [Posthum. Papers 2:] 34. 1848. *Clerodendron* Griff. ex C. B. Clarke in Hook. f., Fl. Brit. India 4: 593 in syn. 1885. *Clerodendrum bracteatum* "Wall. ex Walp." apud Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 75, 108, & viii. 1921.

Bibliography: Wall., Numer. List [49], no. 1800. 1829; Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; Walp., Repert. Bot. Syst. 4: 106. 1845; Schau. in A.D.C., Prodr. 11: 665. 1847; Griff., Itin. Notes [Posthum. Papers 2:] 34. 1848; Buek, Gen. Spec. Syn. Candoll. 3: 105. 1858; Gamble, Man. Indian Timb., ed. 1, 299 & 504. 1881; C. B. Clarke in Hook. f., Fl. Brit. India 4: 589 & 593. 1885; Baill., Hist. Pl. 11: 95. 1891; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1895; Gamble, Man. Indian Timb., ed. 2, imp. 1, 543. 1902; Brandis, Indian Trees, imp. 1 & 2, 508. (1906), imp. 2a, 508 (1907), and imp. 3, 508. 1911; H. Hallier, Meded. Rijks Herb. Leid. 37: 72. 1918; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 75, 87, 108, & viii. 1921; Brandis, Indian Trees, imp. 4, 508. 1921; Gamble, Man. Indian Timb., ed. 2, imp. 2, 543. 1922; Ridl., Journ. Roy. Asiat. Soc. Malay 1: [Malay. For. Trees] 84. 1923; P'ei, Mem. Sci. Soc. China 1 (3): 160. 1932; Fedde & Schust., Justs Bot. Jahresber. 59 (2): 417. 1939; Kanjilal, Das, Kanjilal, & De, Fl. Assam 3: 486, 489, & 546. 1939; Biswas, Indian For. Rec. Bot., ser. 2, 3: 41. 1941; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 54, 63, & 89. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560. 1946; Mold., Alph. List Cit. 1: 35, 105, & 137. 1946; Mold., Alph. List Inv. Names Suppl. 1: 5. 1947; Mold., Alph. List Cit. 2: 360, 558, & 559 (1948), 3: 706 (1949), and 4: 1005, 1101, & 1102. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 125, 143, & 180. 1949; Mold., Résumé 159, 160, 187, 197, 260, & 448. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560. 1960; Deb, Bull. Bot. Surv. India 3: 314. 1961; Hundley & Ko in Lace, Trees Shrubs Burma, ed. 3, 202. 1961; Panigrahi & Naik, Bull. Bot. Surv.

India 13: 362 & 377. 1961; Mold., *Résumé Suppl.* 4: 10. 1962; Legris, *Trav. Sect. Scient. Inst. Franç. Pond.* 6: 185, 502, & 561. 1963; Rolla, *Bull. Bot. Surv. India* 5: 188. 1963; Rao & Joseph, *Bull. Bot. Surv. India* 7: 149. 1965; Panigrahi & Joseph, *Bull. Bot. Surv. India* 8: 151. 1966; Mold., *Résumé Suppl.* 15: 18. 1967; Deb, Sengupta, & Mallick, *Bull. Soc. Bot. Beng.* 22: 199 & 210. 1968; Mold., *Résumé Suppl.* 16: 9 & 20. 1968; Bhakum & al., *Indian Journ. Experiment. Biol.* 7: 250--262. 1969; Rao & Verma, *Bull. Bot. Surv. India* 11: 410. 1969; Farnsworth, *Pharmacog. Titles* 5 (8): iv & item 8898. 1970; Brandis, *Indian Trees*, imp. 5, 508. 1971; Farnsworth, *Pharmacog. Titles* 5, *Cumul. Gen. Ind.* 1971; Mold., *Fifth Summ.* 1: 267, 269--272, 321, 329, 358, 440, & 460 (1971) and 2: 776, 862, & 971. 1971; Gamble, *Man. Indian Timb.*, ed. 2, imp. 3, 543. 1972; Stainton, *For. Nepal* 77 & 166. 1972; Mold., *Phytol. Mem.* 2: 257--259, 270, 312, 320, 348, 390, & 534. 1980.

A fetid subshrub, 1.5--2 m. tall, or small tree, 2.5--8 m. tall; stems to 5 cm. in diameter at breast height; branches and young shoots fulvous-villous; bark ash-color, thin, rough; blaze greenish-cream; branchlets medium-stout, brown, very medullose, obtusely tetragonal, densely short-pubescent with brown hairs, not lenticellate; nodes flattened, slightly ampliate, not annulate; principal internodes 5.5--10 cm. long; leaves decussate-opposite; petioles rather fleshy, often collapsing basally or apically after being picked, medium-slender, 2--13 cm. long, densely short-pubescent, not noticeably ampliate at the base, subterete; leaf-blades membranous or chartaceous, very fragile in drying, dark-green above, lighter beneath, ovate, 7.5--20 cm. long, 3.5--12.5 cm. wide, apically acute or subacuminate to acuminate, marginally entire or obscurely repand, often obscurely 2-lobed at the middle or toward the base, basally subtruncate or shallowly cordate but usually more or less acutely and cuneately prolonged into the petiole, sparsely and softly pilose-pubescent and rather scabridous above, much more densely and softly soft-pubescent or villous to subtomentose beneath especially along the venation; midrib slender, flat or slightly prominent and pilose above, rounded-prominent to the apex beneath; secondaries slender, 4--7 per side, oblique, arcuate-ascending, flat or subprominent above, prominent beneath, joining in many loops near the margins, the lowest pair basal; vein and veinlet reticulation abundant, obscure above, the larger portions slightly subprominent beneath; inflorescence axillary or supra-axillary to terminal, to 19 cm. long and 8 cm. wide, pedunculate, fulvous-villous or -tomentose, forming a large corymbiform panicle or thyrse, with 1--3 head-like cymes; peduncles elongate, firm, ascending, medullose, 5.5--14 cm. long, densely short-pubescent with appressed brown hairs; flowers fragrant; cymes umbellate or corymbiform, many-flowered, conspicuously bracteose, rather uniformly 3--4 cm. long and 4--8 cm. wide; bracts numerous, conspicuous, elliptic or oblong to ovate, subsessile or short-stipitate, 1--3 cm. long, 5--11 mm. wide, both apically and basally sharply acute, often apically apiculate, more or less pilose-tomentose on both surfaces; calyx membranous, about 13 mm. long, deeply divided or 5-fid to more than half its length, the lobes ovate-lanceolate, suberect;



corolla white, externally pubescent, its tube slender, 2.5--5 cm. long, the lobes elliptic, 6--15 mm. long; anthers purple, turning brown; fruiting-calyx enlarged, subcoriaceous, maroon or internally brick-red, the segments rather spreading; fruit drupaceous, globose, 6--8 mm. long and wide, purple or bluish-purple, eventually dehiscent, exposing a pink pericarp and blue seeds.

This species is based on *Wallich 1800* from Pundua, Assam, deposited in the British East India Company herbarium at Kew.

Collectors have encountered the plant in forests and thin forests on hills and precipitous slopes, in open jungles, and in clearings, from 600--1830 m. altitude, in flower from April to June and August to November, and in fruit from January to March and in November. Rolla (1963) reports it "common" in Sikkim; Banerjee and his associates assert that it is "rare" in Nepal; Clarke (1885) claims it is "frequent in Sikkim and Bhutan", from 2000 to 5000 feet altitude. Brandis (1906) reports it "chiefly in clearings". Kanjilal and his associates (1939) found it growing on the hills of Assam to 5500 feet altitude, flowering there from September to November, and fruiting from January to March. Rao & Joseph (1965) found it to be "abundant in several spots in the Northeast Frontier division of India, establishing continuity of the species from Sikkim to the Mishmi Hills of the Lohit frontier division". Deb (1961) found it in "waste places in valleys" of Manipur, citing his no. 728. Panigrahi & Naik (1961) claim that it occurs, but not commonly, in the second and third stories of tropical evergreen forests, citing their no. 19350; Panigrahi & Joseph (1966) record it as "abundant" in Nafa, citing their nos. 16707 & 16943; Deb and his associates (1968) report it "scattered in open jungles" in Bhutan, citing Deb 52.

Vernacular names reported for the species are "anphui-rathol", "bikbi-kelok", "dieng-kylasla", "dieng-iarem", "dieng-rasma", "dom-bhetal", and "mishimiao-guphu".

Hundley & Ko (1961) regard *Volkameria alternifolia* Burm. as a synonym of this taxon, but in my opinion Burman's name plainly belongs in the synonymy of *C. calamitosum* L.

Clarke 16499 & 26411d and Masters 35, 235, & 1393 are mixtures with *C. colebrookianum* Walp.

Material of *C. bracteatum* has been misidentified and distributed in some herbaria as *C. canescens* Wall. On the other hand, Curtis 157 and L'Herzing 7173, distributed as typical *C. bracteatum*, actually represent its var. *sumatranum* Ridl., while *Wallich 1804* is the type collection of *C. canescens* Wall., *Rock 710* is *C. viscosum* Vent., and *Helfer 6053* is *C. viscosum* var. *nilagiricum* H. Hallier. *Watt 6641* is a mixture with *C. philippinum* Schau.

Citations: NEPAL: Banerjee, Upadhyay, & Baskala 3383 (W--2581500). BHUTAN: C. B. Clarke 26358a (L), 26411d (W--802995). INDIA: Assam: Chand 2072 (Mi, Mi), 4718 (Mi), 5753 (Mi), 8168 (Mi); C. B. Clarke 16499 in part (W--802581), 18045c (L), 41493d (L), 44708a (L); Hooker & Thomson s.n. [Mont. Khasia, 4000 ped.] (L, Mu--773, N, Pd, S); Jenkins s.n. [Assam] (Mu--777, Mu--1152); Kingdon-Ward 18877 (N); Koelz 28094 (Mi), 29697 (Mi); Mann s.n. [Khasia hills] (L); Masters

35 [235, 1393] in part (Bz--18766); *Wallich 1800* (L--isotype). Manipur: *G. Watt 6641* in part (Pd). Sikkim: *R. E. Cooper 543* (B); *J. D. Hooker s.n.* [Sikkim, 1-4000 ped.] (L, M, Mu--774, Pd, S); *T. Thomson s.n.* [Sikkim] (Bz--19768, Bz--18769, Bz--18770, Bz--18771, L, L, Pd); *Treutler 365* (L). West Bengal: *C. B. Clarke 11817a* (W--802354). BANGLADESH: *Griffith 6046* (L, Mu--775, S); *Wallich 1796/1* (L). CULTIVATED: Denmark: *Herb. Hort. Bot. Hafn. s.n.* (Cp). India: *Chand 6303* (Mi); *Herb. Hort. Bot. Calcut. s.n.* (Bz--19767); *Wallich 6315a* (L). LOCALITY OF COLLECTION UNDETERMINED: *Collector undetermined s.n.* (Pd).

*CLERODENDRUM BRACTEATUM* var. *BÜNNEMEIJERI* Mold., *Phytologia* 4: 45. 1952.

Bibliography: Mold., *Phytologia* 4: 45. 1952; Mold., *Résumé* 187 & 448. 1959; Mold., *Fifth Summ.* 1: 321 (1971) and 2: 862. 1971; Mold., *Phytol. Mem.* 2: 312 & 534. 1980.

This variety differs from the typical form of the species in having the leaf-blades glabrate or glabrescent beneath, the corolla-tubes sparsely strigillose-pilose, and the calyx-lobes conspicuously elliptic (instead of ovate) and with recurved margins.

The type of the variety was collected by H. A. B. Bunnemeijer (no. 8869) -- in whose honor it is named -- at G. Koerintji, at an altitude of about 1770 m., on the west coast of Sumatra, on March 15, 1920, and is deposited in the Utrecht herbarium. A vernacular name reported for it is "kajoe boerta-boerta batoe".

Citations: GREATER SUNDA ISLANDS: Sumatra: *Boeea 10838* (N); *Bunnemeijer 8869* (Ld--photo of type, N--fragment of type, N--photo of type, Ut--58422--type).

*CLERODENDRUM BRACTEATUM* var. *SUMATRANUM* Ridl., *Journ. Malay Br. Roy. Asiat. Soc.* 1: 84 [as "*Clerodendron*"]. 1923; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 1, 63 & 89. 1942.

Synonymy: *Clerodendron condensatum* Miq., *Fl. Ned. Ind.* 2: 874--875. 1858. *Clerodendron bracteatum* var. *sumatranum* Ridl., *Journ. Malay Br. Roy. Asiat. Soc.* 1: 84. 1923. *Clerodendron condensatum* Miq. apud Mold., *Known Geogr. Distrib. Verbenac.*, ed. 1, 63 & 89. 1942.

Bibliography: Miq., *Fl. Ned. Ind.* 2: 874--875. 1858; Miq., *Fl. Ned. Ind. Suppl.* 1: 242. 1861; J. F. Wats., *Ind. Nat. Scient. Names* 434. 1868; Jacks. in *Hook. f. & Jacks.*, *Ind. Kew.*, imp. 1, 1: 560. 1893; H. J. Lam, *Verbenac. Malay. Arch.* 262 & 363. 1919; Bakh. in *Lam & Bakh.*, *Bull. Jard. Bot. Buitenz.*, ser. 3, 3: 87, 108, & viii. 1921; Ridl., *Journ. Malay Br. Roy. Asiat. Soc.* 1: 84. 1923; Fedde & Schust., *Justs Bot. Jahresber.* 59 (2): 417. 1939; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 1, 63 & 89. 1942; Jacks. in *Hook. f. & Jacks.*, *Ind. Kew.*, imp. 2, 1: 560. 1946; Mold., *Alph. List Inv. Names Suppl.* 1: 6. 1947; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 2, 143 & 180. 1949; Mold., *Résumé* 187, 197, 448, & 449. 1959; Jacks. in *Hook. f. & Jacks.*, *Ind. Kew.*, imp. 3, 1: 560. 1960; Mold., *Fifth Summ.* 1: 321, 322, 329, & 440 (1971) and 2: 862 & 864. 1971; Mold., *Phytol. Mem.* 2: 312, 313, 320, 534, & 535. 1980.

A bush or treelet, 3--6.5 m. tall; stems to 7 cm. in diameter

at breast height; branches tetragonal, villous-tomentose; twigs pale brown-pubescent; leaves decussate-opposite; petioles rather elongate, villous-tomentose; leaf-blades thick-coriaceous, dull dark-green, ovate, apically acute or acuminate, marginally entire, with scattered shiny glands on both surfaces, puberulent to glabrescent above, very softly gray-pubescent or villous-tomentose beneath, the upper only 5--10 cm. long; inflorescence composed of supra-axillary cymes forming a terminal corymbiform thyrse, during anthesis contracted in fasciculate fashion, villous-tomentose; bracts foliaceous, elliptic-oblong, involucrate; bractlets narrower, subtending the individual calyxes, about 4 mm. long, glandulose, villous; calyx light-green, campanulate, 5-fid to the middle, externally pubescent, the lobes ovate, apically short-acuminate, marginally ciliolate, in fruit reflexed, rather thick-textured, internally brightly colored; corolla white, externally densely villous, the tube slender, less than 2.5 cm. long (when still undeveloped?), the lobes subequal; filaments white; anthers purple or yellow-brown; style white; immature fruit sordid-green.

Ridley (1923), in his original description of this variety, says merely that the bracts are "much smaller than in the Indian form. A bush. Flowers white. Edge of woods on hills, Berastagi. Distrib. Indo-Malaya."

Miquel's original (1858) description of *C. condensatum* is "Ramuli tetragoni cum petiolis foliis subtus inflorescentiâ floribusque villosito-tomentosi, folia opposita longiuscule petiolata ovata acuminate vel acuta integerrima crasse coriacea, utrinque (ut pluraeque reliquae partes) glandulis lucidis conspersa, supra pubera glabrescentia, subtus mollissima, (suprema) 4--2 poll. longa, cymae superne axillares in terminalem thyrsum plane corymbiformem collectae, sub anthesi fasciculato-contractae, bracteis foliaceis elliptico-oblongis involucrate, calycis bracteolis angustioribus suffulti. glandulosi et villosi, 2 lin. superantis campanulati ad medium 5-fidi lacinae ovatae brevi-acuminatae marginibus reflexae ciliolatae crassiusculae intus coloratae, corollae extus dense villosae tubus gracilis (virginus pollice brevior), limbus subaequalis? -- Sumatra, bij Alahan Pandjang (Teysm.) -- Pangi-pangi mal."

Bakhuizen (1921) regarded *C. condensatum* as a synonym of typical *C. bracteatum* Wall., while Lam (1919) regarded it as a valid species, citing "Miquel? in H.A.R.T. sub no. 049917 (H. Bog. no. 1167), DeVriese in H.L.-B. sub no. 908.266-618", and *Beccari 261*. Moldenke (1971) regarded it as a synonym of *C. inerme* (L.) Gaertn., obviously incorrectly so.

Although Miquel (1858) gives no number to the original Teijsmann collection, it appears that the species is actually based on *Teijsmann 1167 H.B.* from Alahan-Pandjang, Sumatra, deposited in the Utrecht herbarium. *Yates 1407* is said by Merrill to be a topotype of *C. bracteatum* var. *sumatranum*. A wood sample accompanies *Wilde & Wilde-Duyffjes 14114*.

Collectors have encountered *C. bracteatum* var. *sumatranum* in montane rainforests, near waterfalls, at the edges of forests, and in secondgrowth, at 850--1770 m. altitude, in flower from October to December, as well as in April and from June to August, and in

fruit in July. Vernacular names reported for it are "boerta-boerta tombak", "pangi-pangi", and "si boerta begoe".

Material of this taxon has been misidentified and distributed in some herbaria as typical *C. bracteatum* Wall. or as *C. longituba* Val. On the other hand, the *Bartlett 6783*, distributed as *C. bracteatum* var. *sumatranum*, actually is *C. villosum* Blume.

Citations: GREATER SUNDA ISLANDS: Sumatra: *Beccari 261* (K); *Boea 8599* (Mi, N, W--2275358), *9789* (Mi, W--2275855); *Blunnemeijer 3752* (Bz--18750, Bz--18751), *5365* (Bz--18763), *5582* (Bz--18753), *5665* (Bz--18752), *8040* (Bz--18761, Bz--18762, Ut--58421), *8869* (Bz--18759, Bz--18760); *C. Curtis 157* (K, Ld--photo, N, N--photo); *Dorsett & Fairchild 551* (Ar--3293); *Hamel & Toroes 504* (Mi, Mi); *Jacobson 2445* (Bz--18757, Bz--18758); *LBrzing 4572* (Bz--18748, Bz--18749), *4592* (Ut--63840), *6878* (Bz--18755), *7173* (Bz--18756, N), *9965* (Bz--18754); *Teijsmann 1167* H.B. (Bz--18764, Ld--photo, N--photo, Ut--49917); *Van Steenis 9404* (Bz--72869); *Wilde & Wilde-Duyffjes 14114* (W--2924108); *Yates 1407* (B, Ca--26397, Mi, N, N). LESSER SUNDA ISLANDS: Timor: *Teijsmann s.n.* (Bz--18765).

*CLERODENDRUM BRACTEOSUM* Kostel., Allg. Med.-Pharm. Fl. 3: 831 [as "*Clerodendron*"]. 1834; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 54 & 89. 1942.

Synonymy: *Clerodendron bracteosum* Kostel., Allg. Med.-Pharm. Fl. 3: 831. 1834. *Clerodendrum bracteosum* Costel. apud Blasco, Trav. Sec. Scient. Techn. Inst. Franç. Pond. 10: 384 sphalm. 1971.

Bibliography: Kostel., Allg. Med.-Pharm. Fl. 3: 831. 1834; Baill., Hist. Pl. 11: 95. 1891; A. W. Hill., Ind. Kew. Suppl. 9: 68. 1938; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 54 & 89 (1942) and ed. 2, 125 & 180. 1949; Mold., Résumé 160 & 448. 1959; Razi, Rec. Bot. Surv. India 18: 12. 1959; Mold., Résumé Suppl. 3: 16. 1962; Blasco, Trav. Sec. Scient. Techn. Inst. Franç. Pond. 10: 384. 1971; Mold., Fifth Summ. 1: 272 (1971) and 2: 776 & 862. 1971; Mold., Phytol. Mem. 2: 259 & 534. 1980.

Kosteletzky's original (1834) description of this plant is: "Deckblättereriger L[oo]sbaum]. Blätter dreiständig, sitzend, elliptisch, grob-gesägt, oben kahl, unten filzig; Trugdolden in einer verlängerten, endständigen, bedeckblätterigen Rispe; Fruchtkelch unverändert. -- Rheede 4. t. 29. Bäumchen von 7', mit zahlreichen, 3-seitigen, grünen Aesten. Blätter 1' lang, 5--6" breit, an beiden Enden verschmälert, oben schwarz-grün, unten blässer, der mittlere und die seitlichen Nerven stark vorragend. Trugdolden in den Achseln der obersten Blätter und der dreiständigen, grossen, elliptisch-lanzlettlichen, zugespitzten, ganzrandigen Deckblätter, gabelspaltig, ausgesperret, 15-blüthig. Deckblätteren lineal-lanzlettlich. Kelch 5-spaltig; Zipfel stütz. Corolle bläulich; Zipfel verkehrt-eiförmig, länglich, einwärts gekrümmt. Früchte rundlich-3-eckig, schwarz-roth. -- Häufig an sandigen Stellen in Malabar. ♀. -- Die bittere Wurzel ist ein Magen stärkendes, Verdauung beförderndes Mittel, aus den aromatischen, bitteren und scharfen Blättern wird eine Salbe gegen Kopfschmerz, Augenkrankheiten u.s.w. bereitet und die wohlriechenden, bitterlichen Früchte wirken

auf den Stuhlgang und auf die Harn-Absonderung." The type is said to have come from Bombay on the Malabar Coast of western peninsular India.

It is perhaps worth noting here that the Baillon (1891) reference in the bibliography (above) is sometimes cited as "1892", the titlepage date, but pages 1 to 304 of volume 11 were actually published in 1891.

This species, being based on Rheedee's plate, as clearly stated by the author, is obviously conspecific with -- and the name a synonym of -- *C. serratum* (L.) Moon, which see.

*CLERODENDRUM BRASSII* Beer & Lam, *Blumea* 2: 222--224, fig. 1 [as *Clerodendron* ]. 1936; H. N. & A. L. Mold., *Pl. Life* 2: 51. 1948.

Synonymy: *Clerodendron brassii* Beer & Lam, *Blumea* 2: 222. 1936.

Bibliography: Beer & Lam, *Blumea* 2: [221]--224, fig. 1. 1931; Kanehira & Hatusima, *Bot. Mag. Tokyo* 56: 113--114. 1942; Hill & Salisb., *Ind. Kew. Suppl.* 10: 55. 1947; H. N. & A. L. Mold., *Pl. Life* 2: 51. 1948; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 2, 149 & 180. 1949; Mold., *Résumé* 200 & 448. 1959; Mold., *Fifth Summ.* 1: 335 & 338 (1971) and 2: 862. 1971; Hartley, *Dunstone, Fitzg., Johns, & Lambertson, Lloydia* 36: 293. 1973; Farnsworth, *Pharmacog. Titles* 9 (1): vi. 1974; Mold., *Phytol. Mem.* 2: 325, 328, & 534. 1980.

Illustrations: Beer & Lam, *Blumea* 2: 223, fig. 1. 1936.

A tall soft-wooded shrub, to 2 m. tall; branchlets purple, glabrous; nodes (when dried) slightly inflated; internodes tetragonal, alternately compressed; leaves decussate-opposite; petioles slender, 12 cm. long, purple; leaf-blades membranous, ovate, about 27 cm. long and 20 cm. wide, apically acuminate, marginally entire, basally cordate, glabrous on both surfaces; midrib purple, prominent beneath; secondaries 9 or 10 per side, prominent, straight or slightly curvate and sinuate, purple, the 3 lowest ones basal; tertiaries transverse; veinlet reticulation minute, somewhat conspicuous, translucent; inflorescence paniculate, about 20 cm. long and wide or longer, glabrous; peduncles about 7 cm. long, glabrous; bracts somewhat foliaceous, persistent, 4--15 mm. long, 2--5 mm. wide; pedicels slender, 3--4 mm. long; calyx membranous, about 1.5 cm. long, externally glabrous, tripartite, the 2 larger lobes 9--12 mm. long and apically bidentate, the 1 smaller lobe 5 mm. long and apically entire; corolla red, exserted, glabrous, in bud broadly clavate, the tube narrowly cylindrical, 2.5 cm. long, the 5 lobes obovate, 1.5 cm. long, 8 mm. wide, rather spreading; stamens 4, much exserted, inserted in the throat of the corolla; filaments slender, 6--7 cm. long, glabrous; anthers small, 2.5--3.5 mm. long; style filiform, exserted, 6 cm. long; stigma bifid; ovary 4-lobed, externally glabrous, imperfectly 4-celled, the 4 ovules anatropous, attached to parietal placentae.

The species is based on *Brass* 3867 from the Ononge Road, Dieni, in the Central Division of Papua, New Guinea, at 500 m. altitude, where the plant is said by the collector to have been fairly common in roadside regrowth vegetation. Beer & Lam (1936) comment that

"The present species is a characteristic representative of the section *Tridens* thus far only known from the Lesser Sunda Islands by two species: *C. Elberti* Hall. f. and *C. Hettae* Hall. f. This the more remarkable since this section, especially *C. Hettae*, shows in its calyx and corolla some relations to *Faradaya*, a typical eastern genus (N. Borneo, Talaud, Moluccas, New Guinea, Australia, Polynesia). This taxonomical relation is now geographically confirmed. All three species are closely allied: *C. Brassii* differs from *C. Elberti* only in some minor points (bidentate calyx lobes, broader petals); from *C. Hettae* it is distinguished by much smaller flowers."

Recent collectors have encountered *C. brassii* in disturbed foothill rainforests and in alluvial rainforests, at 300--500 m. altitude, in flower in August. Kanehira & Hatusima (1942) cite their no. 12412 from southeastern New Guinea; Hartley and his associates (1973) cite their no. 9954.

Citations: NEW GUINEA: Papua: *Brass* 3867 (N--isotype). NEW GUINEAN ISLANDS: Japen: *Aet & Idjan* 503 (Bz--72975). MOUNTED ILLUSTRATIONS: Beer & Lam, *Blumea* 2: 223, fig. 1. 1936 (Ld).

*CLERODENDRUM BRAZZAVILLENSE* A. Chev., *Sudania* 1: 62 hyponym [as "*Clerodendron*"]. 1911; B. Thomas, *Engl. Bot. Jahrb.* 68: [Gatt. *Clerod.*] 91. 1936.

Synonymy: *Clerodendron brazzavillense* A. Chev., *Sudania* 1: 62. 1936.

Bibliography: A. Chev., *Sudania* 1: 62. 1911; A. W. Hill, *Ind. Kew. Suppl.* 6: 49. 1926; B. Thomas, *Engl. Bot. Jahrb.* 68: [Gatt. *Clerod.*] 91. 1936.

Nothing is known to me of this taxon except that it is based on *Chevalier* 4138 & 4150 from the Republic of Congo.

*CLERODENDRUM BREVIFLORUM* Ridl., *Journ. Bot. Brit.* 33: 43 [as "*Clerodendron breviflora*"]. 1895; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 1, 60 & 89. 1942.

Synonymy: *Clerodendron breviflora* Ridl., *Journ. Bot. Brit.* 33: 43. 1895. *Clerodendron curtisii* H. H. W. Pearson, *Kew Bull. Misc. Inf.* 1901: 142--143. 1901. *Clerodendron breviflorum* Ridl., *Fl. Malay Penins.* 2: 628. 1923. *Clerodendron breviflores* Thomas, *Engl. Bot. Jahrb.* 68: [Gatt. *Clerod.*] 7 sphalm. 1936. *Clerodendron curtisii* H. H. W. Pearson ex Mold., *Known Geogr. Distrib. Verbenac.*, ed. 1, 60, 61, & 89. 1942. *Clerodendron brevifolium* Ridl. ex Mold., *Known Geogr. Distrib. Verbenac.*, ed. 2, 139 & 180 sphalm. 1949. *Clerodendron curtisii* N. E. Br. ex Mold., *Fifth Summ.* 1: 443 in syn. 1971.

Bibliography: Ridl., *Journ. Bot. Brit.* 33: 43. 1895; Durand & Jacks., *Ind. Kew. Suppl.* 1, imp. 1, 101. 1901; H. H. W. Pearson, *Kew Bull. Misc. Inf.* 1901: 142--143. 1901; Gamble in King & Gamble, *Journ. Asiat. Soc. Beng.* 74 (2 extra): 826 & 833--834. 1908; Prain, *Ind. Kew. Suppl.* 3: 44. 1908; H. J. Lam, *Verbenac. Malay. Arch.* 284 & 363. 1919; Bakh. in Lam & Bakh., *Bull. Jard. Bot. Buitenz.*, ser. 3, 3: 74, 83, 108, & viii. 1921; Ridl., *Fl. Malay Penins.* 2: 624 & 628. 1923; E. D. Merr., *Univ. Calif. Publ. Bot.* 15: 266. 1929;

B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 7. 1936; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1946; Mold., Alph. List Inv. Names 17. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 60, 61, & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 55. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 138, 139, 180, & 181. 1949; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 101. 1959; Mold., Résumé 179, 260, 262, 271, 448, & 449. 1959; Burkill, Dict. Econ. Prod. Malay Penins. 1: 590. 1966; Mold., Fifth Summ. 1: 304, 307, 440, 443, & 460 (1971) and 2: 862 & 864. 1971; Mold., Phytol. Mem. 2: 295, 298, 534, & 535. 1980.

A small shrub or subshrub; stems fistular, obtusely angular, whitish, about 8 mm. in diameter, unarmed, myrmecophilous; branchlets fistular, striate, minutely puberulent; leaves decussate-opposite; petioles rather stout, 6--7.5 cm. long, dilated or swollen in the middle, pithy, not hollow, striate, very minutely puberulent; leaf-blades subcoriaceous or membranous, lanceolate to obovate, 11--22 cm. long, 6--11 cm. wide, apically acute or obtusely acuminate, marginally entire, basally rounded, glandulose, glabrescent above, minutely puberulent beneath, the venation prominulous; secondaries 9--12 per side, ascending, arcuately joined near the margins; tertiaries subparallel; inflorescence terminal, paniculate, 12--30 cm. long, about 6.5 cm. wide, bracteate, many-flowered, puberulent, terminating in a bracteose non-floriferous spike, the branches short, verticillate, angulate, rather thick; lower bracts foliaceous, 2 cm. long, upper bracts linear or subulate, about 2.5 mm. long; pedicels 6 mm. long; flowers numerous, congested at the ends of the inflorescence-branches; calyx campanulate, deeply five-lobed, minutely pubescent and also lepidote on both surfaces, its tube 2.5--3.5 mm. long, the lobes lanceolate, 5--7.5 mm. long, 2.5--3 mm. wide, apically acuminate, 3-veined, marginally ciliate; corolla orange, its tube cylindric, 1.2--2.5 cm. long, straight, pubescent and with clavate sessile glands on both surfaces, the lobes unequal, obovate-elliptic or the 2 shorter ones obovate-rotund, the 3 longer ones narrowly spatulate-oblong, 6--7.5 mm. long, 3 mm. wide, glabrous, marginally minutely ciliate; stamens very slender, about 2.5 cm. long, equaling to twice as long as the corolla-tube, long-exserted; anthers minute, oblong; style very slender, equaling the stamens; stigma short; ovary externally glabrous.

This species is based on *Lake & Kelsall s.n.* from Kampong Chin-Chin, Ulu Batu Pahat, Johore, Malaya. Ridley (1895) comments that "A single specimen was brought by the expedition across Johore in 1892. I have no note of the colour of the flowers. This species differs from the last-named [*C. myrmecophilum* Ridl.] in the more coriaceous leaves, denser panicle with shorter and stouter branches, often four in a whorl; the larger calyx, and very much shorter corolla, with broader lobes; the stamens are twice as long as the tube. As in the last species, the panicle ends in a spike of bracts without any flowers. The petioles, though swollen in the middle like the stem, are not hollow, but contain pith. *C. fistulosum* Becc., from Borneo, differs in its much longer flowers crowded at the apex, as in *C. Siphonanthus*, and white, with much shorter stamens and pistil."

Pearson's *C. curtisii* was based on *Curtis 3441* from damp places at Bruas, Dinding Island, Malaya.

Nothing is known to me of this taxon beyond what is given in its bibliography (above).

Citations: MOUNTED CLIPPINGS: H. H. W. Pearson, Kew Bull. Misc. Inf. 1901: 142. 1901 (W).

*CLERODENDRUM BROOKEANUM* W. W. Sm., Notes Roy. Bot. Gard. Edinb. 8: 320--321 [as "*Clerodendron*"]. 1915; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 65 & 89. 1942.

Synonymy: *Clerodendron brookeanum* W. W. Sm., Notes Roy. Bot. Gard. Edinb. 8: 320. 1915. *Clerodendron macrophyllum* Hook. ex W. W. Sm., Notes Roy. Bot. Gard. Edinb. 8: 321 in syn. 1915 [not Blume, 1826, nor Hort., 1847, nor Sims, 1825].

Bibliography: W. W. Sm., Notes Roy. Bot. Gard. Edinb. 8 & 320--321. 1915; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; Fedde & Schust., Justs Bot. Jahresber. 43: 158. 1922; Mold., Alph. List Inv. Names 18. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 65 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 51. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 145 & 180. 1949; Mold., Résumé 192, 266, & 448. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Mold., Fifth Summ. 1: 321 & 450 (1971) and 2: 862. 1971; Mold., Phytol. Mem. 2: 312, 384, & 534. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 418. 1983.

A subshrub; branchlets subquadrate, at least the young ones not fistular; bark gray; leaves decussate-opposite; petioles rigid, 7--8 cm. long; leaf-blades (when dried) lightly membranous, mostly oblong, 25--30 cm. long, 8--10 cm. wide, apically abruptly short-acuminate, marginally entire, basally rounded or slightly attenuate, glabrous on both surfaces; secondaries 7 or 8 per side, slender, slightly elevated beneath; inflorescence terminal, paniculate, 10--30 cm. long (including the peduncle), about 8 cm. wide, many-flowered, minutely glandular-puberulent; peduncles rigid, about 10 cm. long; panicle-branches divaricate, flattened, the cymules few-flowered; bracts linear or subulate, 3--4 mm. long, puberulent; bractlets numerous, linear or setaceous; pedicels slender, red-purple, 5--10 mm. long; calyx about 5 mm. long, reddish in drying, externally puberulent, bipartite, the lobes linear-lanceolate, apically acuminate; corolla red-orange (when dried), about 3 cm. long, its tube slender, cylindrical, about 2.3 cm. long, the lobes narrowly obovate-oblong, apically rounded, the upper ones very slightly longer; stamens exerted 2--3 cm. from the corolla-mouth; filaments very slender, red; anthers small; ovary subglobose.

This species is based on *Native collector 142* from near Gunong Bayat, Sarawak, collected in January of 1914 and deposited in the Edinburgh herbarium. It is named in honor of the Rajah of Sarawak, Sir Charles Anthony Johnson Brooks [né Johnson] (1829--1917).

Smith (1915) cites also a specimen in the Kew herbarium without collector's name or number and bearing Hooker's manuscript name of *Clerodendron macrophyllum*, as well as *Haviland & Hose 3560*, also from Sarawak and also at Kew.

[to be continued]



BRICKELLIA MCDONALDII (ASTERACEAE, EUPATORIEAE),  
A NEW SPECIES FROM NORTHEASTERN MEXICO.

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The following collection from Peña Nevada in southern Tamaulipas is described as new:

Brickellia mcdonaldii B. L. Turner, sp. nov.

B. grandifolia accedens sed foliis parvioribus crassioribus dense puberulentis punctulis glanduloribus multioribus confertioribus, scapis longioribus, cymis subumbellatis, etc.

Stems terete, dark brown or purplish, densely puberulent. Perennial herb 30-50 cm high. Leaves opposite throughout, or opposite below and alternate above; petioles 2-5 mm long, coarsely puberulent; blades thickened, broadly ovate to deltoid, 2.0-2.5 cm long, 1.5-3.0 cm wide, puberulent and abundantly glandular-punctate on both surfaces, the margins crenate to denticulate. Heads 5-8 in sub-umbellate cymes, borne terminal on nearly naked scapes up to 35 cm long, the ultimate peduncles 10-15 mm long. Involucres campanulate, 12-14 mm long, 8-10 mm wide, 4-5 seriate, unevenly imbricate, subtended by 2-4 loose bracts; bracts linear-lanceolate, the outermost puberulent and non-scarious, the innermost glabrous and scarious. Florets ca 35; corollas ca 7 mm long, 1.5 mm wide, glabrous, tubular, gradually broadening upwards, not, or but slightly, constricted beneath the lobes, the lobes acute, purplish, ca 0.6 mm long. Style branches purple. Achenes ca 4.5 mm long, densely short-hirsute with spreading hairs; pappus of ca 40 fragile densely ciliate bristles, 6-7 mm long.

TYPE: MEXICO. TAMAULIPAS: Sierra Peña Nevada, E side arriba de la Marcella, ca 3000 m, 6 Jul 1985, A. McDonald 1676 (holotype TEX; isotypes to be distributed).

The species apparently belongs to the widespread Brickellia grandiflora but can be readily distinguished by its smaller, thicker, more pubescent leaves and elongate flowering scapes with subumbellate cymes.

It is a pleasure to name this very distinct taxon for its only known collector, Dr. Andrew McDonald, graduate of The University of Texas, Austin and currently working out of the Instituto de Investigaciones Alimentarias of the Universidad Autonoma de Tamaulipas. He has assembled of late a rather remarkable assemblage of plants from the subalpine regions of Pena Nevada, several of which are new.

A NEW SPECIES OF HYMENOPPAPPUS (ASTERACEAE-HELIANTHAEAE)  
FROM COAHUILA, MEXICO.

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Hymenopappus, including the present novelty, is a small genus with only 11 species, one of these being widespread in the western United States with several intergrading allopatric infraspecific taxa (i.e., H. filifolius with 12 varieties). Since my early monograph of the group (Turner, 1956) only a single new species of the genus has been proposed by another, H. glandulopubescens by Waterfall (1957). This is a synonym of Bahia glandulosa, as correctly noted by McVaugh (1984).

It came as a surprise, therefore, to happen upon the present novelty in a recent packet of plants transmitted by James Hinton, son of the well-known Mexican collector, G. B. Hinton. Within a fortnight of this reception I received yet another collection of the same species from Dr. Andrew McDonald who affirmed the information on the original collectors label, locally dominant in subalpine forests.

The present taxon, with perhaps equal merit, could have been treated as an altitudinal variant of the poorly known Hymenopappus flavomarginatus, much as I treated the intergrading altitudinal populational variants of H. filifolius, noted above. In spite of its overall similarity to the aforementioned species, it is such a strikingly beautiful and, so far as known, populationally isolated, taxon that it would be demeaning to proclaim it something less than a species.

Hymenopappus hintoniorum B. L. Turner, sp. nov.

H. flavomarginatus accedens sed habitibus robustioribus, capitulis amplioribus, floribus multioribus (plus quam 100), phyllariis rosaceis.

Robust biennial herb to 1.5 m high. Stems terete, striate, white-tomentulose throughout. Leaves of the basal rosette bipinnately dissected, 8-24 cm long, 4-8 cm across, the divisions 1-2 mm wide, tomentulose on both surfaces; petioles 3-7 cm long; stem-leaves like those of the rosette but reduced, largely epetiolate and with fewer divisions. Heads eradiate, hemispheric, arranged in a handsome, terminal, cymose-panicle up to 15 cm high and 30 cm across. Involucres broadly campanulate, 3-4 seriate, eximbricate, 9-10 mm high, 15-20 mm across; bracts broadly oval, undulate or erose, decidedly scarious, yellow or rosy, 7-9 mm long, 6-10 mm wide. Receptacle convex, epaleate. Disk florets numerous

(100+); corollas yellow, ca 3.5 mm long; tube ca 2 mm long, densely glandular-pubescent, ca 1 mm long, the lobes ca 0.8 mm long, reflexed. Achenes (immature) 4-sided, obpyramidal, ca 3.5 mm long, sparsely puberulent along the angles, pappus a scarious crown 0.2-0.4 mm high.

TYPE: MEXICO. Coahuila: Municipality Arteaga, Sierra del Coahuilín, 3250 m; edge of pine forest, locally dominant, 23 June 1984, G. B. Hinton et al. 18876 (holotype TEX; isotypes to be distributed by J. Hinton).

Additional specimen examined: MEXICO. Coahuila: Sierra Coahuilón, 3400-3500 m, S side, subalpine zone dominated by *Pinus hartwegii*, 18 Jun 1985, A. McDonald 1532 (TEX).

*Hymenopappus hintoniorum* is a lovely plant with numerous large rosy heads. It occurs in subalpine forests from 3200-3500 meters where it has been described as locally "dominant" by both known collectors. *Hymenopappus flavomarginatus* I. M. Johnst. also occurs in the general region of *H. hintoniorum* but it is a smaller plant with fewer, smaller, heads and has a much wider distribution. It generally occurs at lower elevations (2000-2400 m), being especially abundant in the white gypseous hills about Cerro Potosi.

It is a pleasure to name this attractive subalpine endemic (which might well prosper in a British garden) for the G. B. Hinton family, originally from England but presently Mexican citizens working out of their hacienda in San Rafael, just below the western aprons of Cerro Potosi.

#### LITERATURE CITED

- McVaugh, R. 1984. *Bahia*, in *Flora Novo-Galiciana* 12: 110.
- Turner, B. L. 1956. A cytotaxonomic study of the genus *Hymenopappus* (Compositae). *Rhodora* 58: 691-694.
- Waterfall, U. T. 1957. A new Mexican species of *Hymenopappus*. *Rhodora* 59: 97.

## BOOK REVIEWS

Alma L. Moldenke

Friedrich G. Barth's "INSECTS AND FLOWERS: The Biology of a Partnership" translated by M. A. Biederman-Thorson, ix & 298 pp., 47 color photo. pl., 16 EM photo. pl, & 97 line draw. Princeton University Press, Princeton, New Jersey 08540. 1985. \$35.00.

This is a wonderfully interesting, captively readable set of obviously ordered and effectively translated writings on such marvels as (1) the *Ficus sycomorus* pollination by fig wasps as first recorded pictorially in the Egyptian royal tombs of 5,000 years ago, (2) the kaleidoscope of flower forms with their special petal and/ or perianth attracting colors including UV, (3) the various alluring scents, (4) the effective shapes adapted into brushes, baskets and sweeping mechanisms for pollen collection, (5) the nectar as attractant and food, (6) the simulation of ripe female moths and butterflies by some orchids alluring copulation-interested males who serve as pollinators, (7) the emphasis on mutuality or "coupled evolution in the competition for limited resources". and (8) the behavioral and sense adaptations of pollinating hymenoptes (especially honey and bumble bees), lepidoptes, diptes and coleoptes. Most informational research records and/or general information recorded in this field has come from botanists who also took notice of the insects. This book is the summary of years of research, literature study, field work and modern chemical and physical experiments of the famous entomologist-author and his advanced students. Among the illustrations a line drawing shows a 4-petalled *Dianthus* and a turkscape lily with its whole 6-parted perianth labelled as petals. These items are just minutiae: this book should reach the hands of all kinds of biologists, nature enthusiasts and those gardeners who wonder about the whys and hows of their growing plants.

"THE LIFE OF PLANTS" by E. J. H. Corner, Reprint Edition, 54 b/w photo. & 103 fig. University of Chicago Press, Chicago, Illinois 60637. 1981. \$10.95 paperbound.

When I received the first edition of this work (1965) I was so positively enthralled with the juxtaposition of ideas and the fascinating writing style that I felt my comments could not do this botanical masterpiece justice and so I consumed about three pages of this journal with excerpts. Beyond his academic training in botany and his emeritus professorship at Cambridge University, the author has had worldwide field experiences and especially in south-east Asia where he trained monkeys to retrieve herbarium materials from high up in the trees. I have gifted several former students

advancing in botany and botanically interested friends with copies of this wonderful book while still in print. I am so pleased that it is again available and at such a modest price.

"THE ENCYCLOPEDIA OF BIRDS" edited by Christopher M. Perrins & Alex L. A. Middleton, xxxi & 447 pp., 700 color photo., 3 b/w photo., 169 line draw. & 97 geog. distr. maps. Facts on File Publications, New York, N. Y. 10016. 1985. \$35.00.

This is an excellent reference book for middle school through university levels because it is very carefully organized and attractively presented by the capable, scholarly editors and their team of 90 specialists. It is also an interesting "coffee table" or gift book because of its many attractive small to large color photographs, and a source of joy and interested knowledge for "birders" worldwide to browse and/or study especially on stormy days when binoculars have to be put aside. Minutiae: todies were omitted from the geographic distribution map on p. 270, the common name, ovenbird, is limited to the family *Furnariidae* of Mexico, Central and South America with no mention or cross reference to *Seiurus aurocapillus* which is even better known by that name than by "wood warbler" in much of eastern and central U.S.A. and Canada.

"THE UNDERSEA PREDATORS" by Carl Roessler, 192 pp. & 200 color photo. Facts on File Publications, New York, N. Y. 10016. 1984. \$24.95.

After paying tribute to the adaptive hunting skills of the giant-sized predators of the open seas, like tuna, whales, and sharks, this superb photographer-author concentrates on the smaller, less known creatures of coral reefs and their adaptive locomotion techniques for catching their live prey. He progresses with his personal observations and wonderful photographs from non-movers like corals to slow movers like brittlestars, to stalkers especially in Australia, to gliders like flatworms and nudibranchs, to swimming browsers like reef fish, to odd couplings like parasite-cleaner fish and their hosts, to masters of disguise, ambush, etc. My personal introduction to many of these creatures was as colorless limp picklings in "lab" jars. They gained some color and life through college lectures, early National Geographic articles and glass-bottom boat viewings. Such a vibrant contrast is provided by this book! It ends with an important reminder that man with his excessive pollution and predation may ultimately destroy the oceanic phytoplankton by some agricultural chemical "run off" and so destroy the earth's food and oxygen supply.

"THE LAST WILDERNESS" by Murray Morgan, xii & 275 pp., Second Printing. University of Washington Press, Seattle, Washington 98105. 1978. \$4.25 paperbound only.

This interesting account of tall tales, tall people and tall trees was first published in 1955 by Viking Press and Macmillan Company, giving the history of the settlement of the Olympic peninsula and the establishment of the Olympic National Park. Botanists would be interested in the mention of Louis Hendersen and his collections. Conservationists would be interested in the efforts of the New York socialite Mrs. Rosalie Edge's efforts in establishing the Olympic National park.

"FOREST ENTOMOLOGY: Ecology and Management" by Robert N. Coulson & John A. Witter, x & 669 pp., 290 b/w photo., 160 fig., 1 map & 15 tab. Wiley Interscience Publication, John Wiley & Sons, New York, N. Y. 10158. 1984. \$39.50.

This very well prepared and very well presented text is planned for the upper college and graduate university levels. Its first section is on general entomology emphasizing and/or reviewing morphology, physiology, taxonomy and the nature of insect damage. The second section is the basic part of the text with its principles and techniques of integrated pest management including population dynamics for both the forest insects and the forest trees and their monitoring and regulation with natural and artificial agents. The last section presents control methods according to insect feeding groups as defoliators, sapsuckers, tip and root feeders, seed and cone destroyers, phloem and wood borers, and gall makers. The many printed photographs are helpful but not a substitute for concomitant field work in the observation and collection of the working insects and mites.

"PHYSIOLOGICAL ASPECTS OF DRYLAND FARMING" edited by U. S. Gupta, xv & 392 pp., 52 b/w fig., 30 tab., & 11 photo, of authors, Allenheld, Osmun & Co., Montclair, New Jersey 07042. 1975. \$18.00.

Since this book was printed in India, perhaps it can be purchased there and in other Asian areas in need of this information at a more practicably reasonable price. It is written by highly competent scientists from several countries and is "authoritative, well-documented and international in scope". The experimental backgrounds of the different strategies that have to be used other than those of the "green revolution" are explained and evaluated.

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