

ADDITIONAL NOTES ON THE GENUS VITEX. III

Harold N. Moldenke

VITEX Tourn.

Additional synonymy: Walrothia Roth ex Bocq., Rev. Verbenac. 181, sphalm. 1863. Tripina Lour. ex Angely, Cat. Estat. Gen. Bot. Fan. 17: 6, sphalm. 1956. Ephiëlis Banks & Soland. ex Angely, Cat. Estat. Gen. Bot. Fan. 17: 6, sphalm. 1956. Agnus Runner, Rep. G. W. Groff Coll. 362. 1961.

Additional & emended bibliography: Westm. in L., Orat. Tellur. Habit. Incr. 60 & 83. 1744; A. L. Juss., Gen. Pl., ed. 1, 107 & 119—123 (1789) and ed. 2, 120. 1791; Horsfield, Verh. Bat. Gen. 8: 104. 1816; W. D. J. Koch, Syn. Fl. Germ., ed. 1, 577—578 & 844. 1837; W. D. J. Koch, Syn. Deutsch. Fl., ed. 1, 575 & Reg. 99. 1838; W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 1, 417 & 604. 1843; W. D. J. Koch, Syn. Fl. Germ., ed. 2, 2: 663. 1844; W. D. J. Koch, Syn. Deutsch. Fl., ed. 2, 681 & 1206. 1846; G. & F. Lorinser, Taschenb. Fl. Deutsch., ed. 1, 311 & 488 (1847) and ed. 2, 311 & 488. 1851; W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 3, 417 & 604 (1851), ed. 4, xliii, 399, & 583 (1856), and ed. 5, xliii, 399, & 583. 1860; Bocq., Adansonia 2: 21—22, 89—90, 101—103, 108, 109, 111, 112, 118, 119, 124—128, 132—139, 141—143, 145, 147, 149, 151—156, 158, 161, 164, & 165, pl. 4 & 6, fig. 1—25 (1862) and 3: 178, 180, 181, 184, 185, 252—254, & 259. 1863; Bocq., Rev. Verbenac. 21—22, 89—90, 101—103, 108, 109, 111, 112, 118, 119, 124—128, 132—139, 141—143, 145, 147, 149, 151—156, 158, 161, 164, 165, 178, 180, 181, 184, 185, 252—254, & 259, pl. 4 & 6, fig. 1—25. 1863; W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 6, xliii, 399, & 583. 1865; Griseb., Cat. Pl. Cub. 216—217. 1866; Aschers. in Schweinf., Beitr. Fl. Aethiop. 1: 120—121. 1867; Miq., Cat. Mus. Bot. Lugd.—Bat. 70. 1870; Carr., Rev. Hort. 43: 415—416. 1871; E. Hall in W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 7, 403 & 802 (1878) and ed. 8, 403 & 802. 1881; Aitch., Journ. Linn. Soc. Lond. Bot. 3: 95. 1888; W. A. Talbot, Syst. List Trees Shrubs Bomb. 159, 161—162, & 229. 1894; Gürke in Engl., Pfl. Ost-Afr. C: 338—340. 1895; K. Schum., Notizbl. Bot. Gart. Berl. App. 1: 55 (1895) and 1: 206. 1896; J. Ramirez, An. Inst. Méd. Nac. Méx. 2: 35—36. 1896; Anon., Notizbl. Bot. Gart. Berl. App. 1: 346. 1897; K. Schum., Notizbl. Bot. Gart. Berl. 2: 144—145. 1898; Anon., Notizbl. Bot. Gart. Berl. App. 2: 419. 1899; K. Schum. in Just, Bot. Jahresber. 28 (1): 497—498. 1902; Beissner, Schelle, & Zabel, Handb. Laubh. 426. 1903; C. B. Clarke in J. Schmidt, Bot. Tidsskr. 26: 172—173. 1904; E. D. Merr., Philip. Journ. Sci. Bot. 1, Suppl. 1: 121. 1906; Bormm., Beih. Bot. Centralbl. 22 (2): 117—118. 1907; Volkens, Notizbl. Bot. Gart. Berl. App. 22 (2): 34—35, fig. 12. 1909; Backer, Ann. Jard. Bot. Buitenz. Suppl. 3: 419. 1910; C. K. Schneid., Ill. Handb. Laubholz. 592 & 594—595, fig. 384 m—q & 385 n—t. 1911;

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Quisumbing (1960) reports that some species of Vitex known as "molave" in the Philippines [probably V. parviflora A. L. Juss.] are now almost extinct due to the use of their wood in the construction of houses and for making railroad ties. Irvine (1930) lists two unidentified species for which he records the native names "akwakora gyhina" [meaning, "shin bone of old man" because of the jagged protuberances on the trunk when young; when older the bark is longitudinally ridged; found in deciduous forests] and "afetewa" [found in secondary forests, the fruit turning black and edible].

Paijmans (1967) states that Vitex is a common genus of trees in mixed deciduous hill forests and in tall evergreen forests on New Guinea as a canopy tree. He is probably referring to V. cofassus Reinw.

A letter to me from Berta Čerin, dated April 29, 1962, states

that she is working on the chemical constituents of several forms of this genus. S. A. Brown (1963) states that "vitexin, an 8-glycosylapigenin, was discovered and named in this genus in 1898 by Perkin; Bate-Smith (1963) reports finding the same chemical in Crataegus. Hänsel, Leuchert, Rimpler, & Schaaf (1965) examined 5 species of Vitex for the presence of flavonoids, pseudo-indicans (iridoids), volatile oils, and Vitex-triterpene-I. They found that the chemical composition was similar for four species with the striking exception of V. megapotamica. Related species were shown to possess remarkable differences in their secondary products. It seems as if chemical characteristics are more indicative of physiological similarities than of morphological plant relationships. Riley (1963) reports finding chromosome numbers of 24, 26, and 32 in this genus.

Hatusima (1966) reports the genus as rare in lowland thickets. Soukup (1964) reports the vernacular name "taruma". Howard, Wagenknecht, & Green (1963) report that this genus is a specialty in the arboretum at Baghdad, Iraq.

It is worth pointing out that the generic name, Vitex, is accredited to Tournefort also by A. L. Jussieu (1789, 1791). It should also be noted that Angely (1956) misspells the name Ephielis Schreb. as "Sphielis" through a typographic error.

To the list of excluded species should be added:

Vitex orientale King, Weeds of the World 501, sphalm. 1966 =
Viscum orientale Willd., Loranthaceae.

It should be noted that the W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 1, reference cited in the bibliography above is often dated "1844". The Lam (1924) reference is often cited as "1925", but the latter date is merely the titlepage date for the entire volume; the pages cited were published in 1924. Beissner, Schelle, & Zabel, Handb. Laubh. (1903) is often cited as "Schelle, Hand. Deutsch. Dendrol. Ges." Westmann (1744) places Vitex in his group "Plantae baccatae" on page 60 and in his group "Sylva" on page 83 of the work cited. Ascherson (1867) cites a species of Vitex in the Chrysomallum group, but unnamed, collected by Cienkowski "bei Kassen in Fesoghlu, 19 März 1848".

The Buchanan 431, distributed in herbaria as representing a species of Vitex, is actually Schrebera alata (Hochst.) Welw.; Burkart 17052 and Pannier & Schwabe 1189 are members of the Bigoniaceae; and G. Gilbert 2168 is also not verbenaceous.

A suggested key to the species of this genus as found in southwestern Asia is as follows:

1. Inflorescence strictly axillary and cymose, much shorter than the subtending mature petioles. Vitex iraquensis Moldenke (IRAQ).
- 1a. Inflorescence mostly terminal (or axillary only in the uppermost leaf-axils), spicate or paniculate, far surpassing the leaves.
2. Leaflets not more than 3; cymes very lax. Vitex trifolia L.

(AFGHANISTAN).

- 2a. Leaflets usually more than 3; cymes usually dense.
3. Inflorescence mostly in dense simple or paniced spikes; cymes sessile or subsessile; leaflets mostly 5—7.
4. Lower lip of corolla beardless on the inner surface.
5. Leaflets mostly narrow and 9—15 mm. wide, lanceolate or narrow-lanceolate. Vitex agnus-castus L. (IRAQ, IRAN, SIND).
- 5a. Leaflets mostly wider and regularly to 25 mm. wide, mostly oblong-lanceolate. Vitex agnus-castus f. latifolia (Mill.) Rehd. (IRAN).
- 4a. Lower lip of corolla bearded on the inner surface. Vitex agnus-castus var. pseudo-negundo Hausskn. (IRAQ, IRAN, AFGHANISTAN, BALUCHISTAN, SIND).
- 3a. Inflorescence mostly in loose panicles; cymes distinctly stipitate; leaflets usually 3—5. Vitex negundo L. (BALUCHISTAN).

VITEX ACUMINATA R. Br.

Additional bibliography: Warb. in Engl., Bot. Jahrb. 13: 429. 1891; C. A. Gardn., Enum. Pl. Austr. Occid. 3: 112. 1931; Moldenke, Résumé 211 & 474. 1959; Moldenke, Phytologia 8: 62. 1961; Moldenke, Biol. Abstr. 37: 1062. 1962; Hocking, Excerpt. Bot. A.6: 533. 1963; J. S. Beard, Descrip. Cat. W. Austr. Pl. 93. 1965.

Material of this species has been misidentified and distributed in herbaria as V. glabrata R. Br.

Additional citations: AUSTRALIAN REGION: AUSTRALIA: Western Australia: W. V. Fitzgerald 212 (Bi).

VITEX AGLAEIFOLIA Mildbr.

Additional bibliography: Moldenke, Phytologia 5: 160 (1955) and 5: 353. 1956; Moldenke, Résumé 139, 142, & 475. 1959.

VITEX AGLAEIFOLIA var. RUFULA Moldenke

Additional bibliography: Moldenke, Phytologia 5: 161. 1955; Moldenke, Résumé 142 & 475. 1959.

VITEX AGNUS-CASTUS L.

Additional & emended synonymy: Agnus castus vulgaris Carr., Rev. Hort. 42-43: 415. 1871. Vitex agnes-castis L. ex Moldenke, Résumé Suppl. 11: 8, in syn. 1964.

Additional & emended bibliography: Cord., Stirp. Descr., ed. nov., 7. 1541; W. D. J. Koch, Syn. Fl. Germ., ed. 1, 577—578. 1837; W. D. J. Koch, Syn. Deutsch. Fl., ed. 1, 575. 1838; W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 1, 417. 1843; W. D. J. Koch, Syn. Fl. Germ., ed. 2, 2: 663. 1844; W. D. J. Koch, Syn. Deutsch. Fl., ed. 2, 681. 1846; G. & F. Lorinser, Taschenb. Fl. Deutsch., ed. 1, 311 (1847) and ed. 2, 311. 1851; W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 3, 417 (1851) and ed. 4, 399. 1856; Munby, Cat. Pl. Alg. 25. 1859; Bocq., Adansonia 2: 109, 111, 125, 132, 133, &

156 (1862) and 3: 253. 1863; Bocq., *Rev. Verbenac.* 109, 111, 125, 132, 133, 156, & 253. 1863; Aschers. in G. Schweinf., *Beitr. Fl. Aethiop.* 278. 1867; Carr., *Rev. Hort.* 43: 415--416. 1871; E. Hall. in W. D. J. Koch, *Taschenb. Deutsch. Fl.*, ed. 7, 403 (1878) and ed. 8, 403. 1881; Stapf, *Denkschr. Akad. Wiss. Wien* 50: 93 [*Beitr. Fl. Lycien* 21]. 1885; J. Ingram, *Lang. of Fls.* 347 & 355. 1887; Aitch., *Journ. Linn. Soc. Lond. Bot.* 3: 95. 1888; Beissner, Schelle, & Zabel, *Handb. Laubh.* 426. 1903; Borm., *Beih. Bot. Centralbl.* 22 (2): 117--118. 1907; Backer, *Ann. Jard. Bot. Buitenz. Suppl.* 3: 419. 1910; C. K. Schneid., *Ill. Handb. Laubholz.* 592--595, fig. 384 o & p, & 385 n--q. 1911; J. Matsumura, *Ind. Pl. Jap.* 2 (2): 534. 1912; Hickel, *Bull. Soc. Dendrol. France* 28: 110 & 111, fig. 45f. 1913; Holland, *Kew Bull. Addit. Ser.* 9 [*Useful Pl. Nigeria* 3]: 525. 1915; Turrill, *Kew Bull. Misc. Inf.* 1922: 297 (1922) and 1924: 359. 1924; L. H. Bailey, *Man. Cult. Pl.*, ed. 1, pr. 1, 632 & 849 (1924) and pr. 2, 632 & 849. 1925; Schwencke, *Zytol. Untersuch. Verbenac.* 7. 1931; Svenson, *Brooklyn Bot. Gard. Record* 22: 7. 1933; Bider, *Beitr. Pharmakog. Borag.* 97 & 104--106, pl. 7, fig. 4. 1935; Paternmann, *Beitr. Zytol. Verbenac.* 34--36, 43, & [55], pl. 3, fig. 32--38. 1935; Troncoso, *Darwiniana* 3: 55. 1937; L. H. Bailey, *Man. Cult. Pl.*, ed. 1, pr. 3, 632 & 849. 1938; Fletcher, *Kew Bull. Misc. Inf.* 1938: 432. 1938; Rehd., *Man. Cult. Trees*, ed. 2, 805. 1940; Oppenheimer & Evenari, *Bull. Soc. Bot. Genève.* 31: 363. 1941; Hottes, *Book Shrubs*, ed. 4, 403 & 404. 1942; Betts, *Jefferson's Gard. Book* 333 & 702. 1944; L. H. Bailey, *Man. Cult. Pl.*, ed. 1, pr. 4, 632 & 849. 1944; Le Cointe, *Amaz. Bras. III Arv. & Plant. Uteis*, ed. 2, 23. 1947; Oppenheimer & Evenari, *Florul. Cisiord.* 353. 1948; Blakelock, *Kew Bull. Misc. Inf.* 1949: 539. 1949; L. H. Bailey, *Man. Cult. Pl.*, ed. 2, 843--844 & 1114. 1949; Van Melle, *Grower* 38: 10. 1951; W. J. Bean in Chittenden, *Roy. Hort. Soc. Dict. Gard.* 4: 2249. 1951; K. H. Rech., *Arkiv Bot.*, ser. 2, 2: 408. 1952; Gorsch, *Fl. URSS* 19: 698. 1953; Thorne, *Am. Midl. Nat.* 52: 313. 1954; Bor & Raizada, *Some Beaut. Ind. Climbers* [136]. 1954; Darlington & Wylie, *Chromosome Atl.*, pr. 1, 323. 1955; Hocking, *Dict. Terms Pharmacog.* 124, 166, & 243. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 77, 78, 80, & 271. 1956; Spector, *Handb. Biolog. Data* 142. 1956; Moldenke, *Biol. Abstr.* 30: 1704 (1956) and 32: 1135. 1958; Shinners, *Spring Fl. Dallas* 328. 1958; J. & L. Bush-Brown, *Am. Gard. Book*, new rev. ed., 278. 1958; Bodenheimer, *Hist. Biol.* 224--225. 1958; Mattoon, *Pl. Buyers Guide*, ed. 6, 294. 1958; Anon., *Kew Bull. Gen. Index* 1929--1956, 293. 1959; K. H. Rech., *Arkiv Bot.*, ser. 2, 5: 346. 1959; Kitamura, *Fl. Afghan.* 327. 1960; T. H. Everett, *New Illustr. Encycl. Gard.* 13: 2433 & 2434, pl. 13-11c. 1960; Belič, Bergant-Dolar, & Morton, *Journ. Chem. Soc.* 1961: 2523. 1961; Darlington & Wylie, *Chromosome Atl.*, pr. 2, 323. 1961; Jiménez, *List Nom. Vernac.* 11. 1961; Moldenke, *Phytologia* 8: 62. 1961; Belič & Čerin, *Vestnik Slovensk. Kemij. Drust.* 9: [33]--34. 1962; Sirait, Rimpler, & Hänsel, *Experimentia* 18: 72. 1962; Nair & Rehman, *Bull. Bot. Gard. Lucknow* 76: 21. 1962; Moldenke, *Biol. Abstr.* 37: 1062. 1962; Zohary, *Pl. Life Palest.* 168 & 217. 1962; Huber in Hutchinson & Dalz., *Fl. W. Trop.*

Afr., ed. 2, 2: 448. 1963; Bush-Brown, Shrubs & Trees Home Landsc. 161, 197, 206, & 210. 1963; R. C. Mey., Bull. Torrey Bot. Club 89: 404. 1963; Quezel & Santa, Nouv. Fl. Alg. 2: 779 & 780. 1963; Gleason & Cronquist, Man. Vasc. Pl. 582. 1963; Ilina, Spice Aromat. Pl. Sov. Russia 71—72, 376, & 427, fig. 52. 1963; Hänsel & Rimpler, Arch. Pharm. 296: 598. 1963; Sharma & Mukhopadhyay, Journ. Genet. 58: 366, 376, 383, & 539, pl. 11, fig. 31. 1963; Harkness, Phytologia 10: 269. 1964; E. E. Lord, Shrubs & Trees Austr. Gard., rev. ed., 321. 1964; R. L. Taylor, Plants Colon. Days 22 & 106. 1964; Moldenke, Résumé Suppl. 11: 3, 5, & 8 (1964) and 12: 2. 1965; Hänsel, Leuckert, Rimpler, & Schaaf, Phytochem. 4: 19, 21, 23, 24, & 27. 1965; Galil, Ind. Sem. Hort. Bot. Tel-aviv. 1966: 5. 1966; Jiménez, Supl. Cat. Fl. Doming. 1: 275. 1966; Kitamura, Results Kyoto Univ. Scient. Exped. Karakoram 8: 132. 1966; Herbst Bros., Seeds for Nurserymen 18. 1966; T. Swain, Compar. Phytochem. 348. 1966; H. Wagner in T. Swain, Compar. Phytochem. 310. 1966; Prodan & Buia, Fl. Mic. Ilus. Roman. 401. 1966.

Additional illustrations: C. K. Schneid., Ill. Handb. Laubholz. fig. 384 o & p & 385 n—q. 1911; Hickel, Bull. Soc. Dendrol. France 28: 110, fig. 45f. 1913; Bider, Beitr. Pharmakog. Borag. 97, pl. 7, fig. 4. 1935; Patermann, Beitr. Zytol. Verbenac. pl. 3, fig. 32—38. 1935; Hottes, Book Shrubs, ed. 4, 404. 1942; T. H. Everett, New Illustr. Encycl. Gard. 13: 2433 & 2434, pl. 13—11c [in color]. 1960; Sharma & Mukhopadhyay, Journ. Genet. 58: 383, pl. 11, fig. 31. 1963; Ilina, Spice Aromat. Pl. Sov. Russia fig. 52. 1963; R. L. Taylor, Plants Colon. Days 22. 1964.

Cytologists report the haploid chromosome number for this plant as 12. Collectors have found the plant growing in clay loam soil, in ravines, in dried-up wadies, and near water, flowering and fruiting in August. Correll & Hanson found it in a mesquite thicket and as a volunteer in a canal in Texas. Shinnars (1958) reports it wild in Erath County, Texas, while Troncoso (1937) states that it is cultivated in Argentina. Matsumura (1912) records it as cultivated in Japan, Cordus (1541) in Italy, and Turrill (1922) in Turkey. Ilin (1963) reports that it is often cultivated in Russia, that the volatile content of its leaves is 0.36—0.48 percent and in its fruit is 0.74 percent, and that the content of the fruit increases with the development and ripeness of the fruit. Belič, Bergant-Dolar, & Morton (1961) and Sirait, Rimpler, & Hänsel (1962) have isolated the flavone, casticin, from its seeds. Lord (1964) notes that the entire plant is aromatic, is improved by hard pruning in early spring, and is uncommon in Australia, but blooming in Melbourne from January to March.

Rechinger (1952) found Vitex agnus-castus growing at 160—350 meters below sealevel in the Dead Sea area and at 1300 meters above sealevel at Cassius. He cites "D.B8172, D.172f, Gomb. 4009, Har. 3097, S.645, and S.2198". The W. D. J. Koch, Taschenb. Deutsch. Fl., ed. 1 (1843) reference cited in the bibliography above, is sometimes misdated "1844".

Quezel & Santa (1963) report that this plant is used medically in Algeria and is there known as "bou mettin" and "kef

mariem". Jiménez (1961) reports the common names "yerba de la suerte" and "yerba luisa" in the Dominican Republic. Rev. Glenn B. Murdock, in a letter to me dated January 18, 1963, reports that Vitex agnus-castus is called "spikenard" in Florida. The names "lavender flowers" and "blue chaste-tree" are also recorded for it (the latter, however, is more properly applied to var. caerulea Rehd.). Beissner, Schelle, & Zabel (1903) call it the "gemeiner Mönchspfeffer" in Germany. According to Betts (1944) and Taylor (1964) the species is mentioned in Thomas Jefferson's "Garden Book". Schneider (1911) gives V. verticillata Lam. as a synonym, but this name belongs rather to f. latifolia (Mill.) Rehd. Mattoon (1958) lists 20 horticultural sources where it may be purchased. Herbst (1966) refers to it as the "lilac chastetree" and sells 1/4 pound of seed for \$1.35, or \$3.40 per pound.

Spector (1956) describes the plant as 15--20 feet tall, with an 8--13-foot spread and a moderate rate of growth. Nair & Rehman (1962) describe the pollen as subprolate, $31 \times 26 \mu$ (with a range of $28-34 \times 23-28 \mu$), the ectine surface "with a faint LO". They cite Nat. Bot. Gard. 36021, and slide 2693, from Lucknow, India. Ingram (1887) says that in the so-called "language of flowers" it is a symbol of coldness or indifference. Zohary (1962) tells us that it forms part of the Nerion oleandri Alliance in Palestine.

Turrill describes the corollas as "mauve and white". Ayres (1966) describes them as "blue", but is probably referring here to var. caerulea Rehd.

A letter to me from M. Darwish, dated February 10, 1956, informs me of his intention to carry out a pharmacognostic study of this plant for a D.Sc. in biology at the Philadelphia College of Pharmacy and Science, but this intention was apparently not accomplished. Hocking (1955) avers that the aromatic seeds are used as a substitute for pepper, and, by European homeopaths, as a stimulant and carminative and the bark as a stimulant tonic.

Of more than passing interest is the following earliest reference to Vitex agnus-castus known to me. It is a description by Valerius Cordus (1514--1544) of Wittenberg from original observations made on travels in Italy and published in his "Stirpes descriptiones", ed. nov., page 7 (1541), as translated by F. S. Bodenheimer in his "History of Biology" (1958):

"No. 8. On the Chaste-tree (Vitex agnus castus). The Agnus or Vitex is usually called Agnus castus. It is a bushy shrub, growing almost into a slender tree, if it is permitted to grow into adolescence. It divides from a fairly thick trunk into many branches. From the trunk it sends out, from near the root, many shoots, which can be easily torn out and, firmly pressed into soil, readily grow again. The young branches and the new twigs rise at regular intervals opposite to each other, as opposed forking twigs from the knots (of the stalk)...The pedicels arise from a single knot, on both sides, one opposite the other, much shorter than a digit, smooth and tender, from the end of

which come out five, seven or sometimes more leaves, all arising from one common organ like a human palm or like the leaves of hemp: long, narrow and sharp, with a straight and prominent upper longitudinal vein all along the leaf, similar to an olive-leaf; but they are much longer and more tender, greenish above, greyish and moderately woolly underneath. The leaves drop in winter. The biggest and longest leaf is the terminal one, the others being slightly smaller, on both sides, the more they are distant from the biggest one. The last two, sometimes the last one, are very small.

"It flowers in June and July at the forked ends of the long and straight twigs; small, elongate, concave, with the extreme margin longer and intended five times, bringing out small and medium stamens; attached to a small green or greyish cup as in the flowers of lavender or rosemary, and equal, on all sides arranged in a ring around the twiglets in some whirls, forming at intervals a long ear [spike]. Inside the little flowers are blue-purple, outside whitish blue, one each in the indentation of the cup. There grow the seeds which are small, rounded, smaller than pepper, greyish, hard, woody. They remain throughout the winter in the forks. They germinate and sprout late. The bark of these twigs is soft, flexible and not easily broken, just as is the nature of the young twiglets. Leaves, flowers, seed and bark have a heavy smell which oppresses the head. The taste of these parts is slightly bitter and sharp, delicate only in the less active bark than in the other parts. The leaves and the seeds have a stronger taste than the flowers. Hence, the sharpness of the leaves and of the unopened flowers cleaves long to the palate when tasted.

"It grows in wild fields and along the sea, not far from inundations and rapidly flowing rivers. Most common are they in the county of Ancona. It is sown in various gardens in Italy, as at Venice, Traversi, Ferrara, Padua and Bologna."

Additional citations: TEXAS: Aransas Co.: Uzzell 142 (Ar—123394). Bell Co.: Moldenke & Woods 585 (S). Eastland Co.: Moldenke & Woods 596 (S). Henderson Co.: A. R. Moldenke 666 (S). Hill Co.: Moldenke & Woods 569 (S). McLennan Co.: Moldenke & Woods 580 (S). Reeves Co.: Correll & Hanson 29838 (Id). San Patricio Co.: F. B. Jones 3385 (Ww). Travis Co.: Ripperton 13 (Ar—306605). ARIZONA: Navajo Co.: Rhoton 300 (S). HISPANIOLA: Dominican Republic: B. Augusto 816 (N). ITALY: C. Bicknell s.n. [Siguria, 8.X.1910] (Hi—195093). CORSICA: Lippert 725 (B). JUGOSLAVIA: Ischia: Sarfatti s.n. [24 Luglio 1956] (Hi—192430). Istria: Starbäck J.127 (S). IRAN: Bunge 1 (W—71641). CULTIVATED: Arizona: A. R. Moldenke 151 (Fg). California: Mallory s.n. [Aug. 15, 1919] (Du—103011). Egypt: Degener & Degener 29590 (Ac). Florida: G. B. Murdock s.n. [Daytona Beach, December 15, 1962] (S). Kansas: V. C. Hubbard s.n. [Manhattan, Sept. 1927] (Lb—27630). New Jersey: H. N. Moldenke 22532 (Ac). New Mexico: D. B. Dunn

7911 (Lb—38347), 8382 (Lb—38353). North Carolina: M. T. Cameron s.n. [July 8, 1933] (Hi—59472); P. O. Schallert s.n. [7/1/31] (Du—354754), s.n. [7/1/36] (Hi—59471). Oklahoma: Gephhardt 608 (W—2421177). Peru: Soukup 2930 (W—1564064). Texas: Moldenke & Woods 571 (S); Purvis 8 (Ld).

VITEX AGNUS-CASTUS f. ALBA (West.) Rehd.

Additional & emended synonymy: Agnus castus vulgaris alba Carr., Rev. Hort. 42-43: 415. 1871. Agnus castus vulgaris var. alba Carr. ex C. K. Schneid., Ill. Handb. Laubholz. 594, in syn. 1911. Vitex agnuscastus alba Mattoon, Pl. Buyers Guide, ed. 6, 294. 1958. Vitex agnus-castus "Alba" Harkness, Phytologia 10: 269. 1964.

Additional bibliography: C. K. Schneid., Ill. Handb. Laubholz. 594. 1911; L. H. Bailey, Man. Cult. Pl., ed. 2, 844 & 1114. 1949; W. J. Bean in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2249. 1951; Mattoon, Pl. Buyers Guide, ed. 6, 294. 1958; Moldenke, Phytologia 8: 26. 1961; Harkness, Phytologia 10: 269. 1964; Moldenke, Résumé Suppl. 11: 8. 1964; Aul, N. Y. Herald Trib. Home & Gard. Sect. 2, April 3. 1966; Wayside Gardens, [Cat.] 1967: 179. 1967.

Additional illustrations: Aul, N. Y. Herald Trib. Home & Gard. Sect. 2, April 3. 1966; Wayside Gardens, [Cat.] 1967: 179 [in color]. 1967.

Aul (1966) reports this plant as offered by Wayside Gardens under the name "Silver Spire". He describes this horticultural variety as "a pure [white] form of Vitex macrophylla in contrast to the cream to lavender whites that have been offered in the past. It has the same distinctive appearance and growth habits as the regular macrophylla but is somewhat smaller in size. The plant is covered with long pointed flower spikes of purest white from July until severe frost, a time when good shrub bloom is virtually non-existent. This should be a most welcome addition to the summer blooming shrubs." Mattoon (1958) lists only one source for the form. It is possible that Silver Spire, being a form of V. agnus-castus f. latifolia (Mill.) Rehd., should not be included in V. agnus-castus f. alba (West.) Rehd., which is a white form of the typical form of the species. Carrière's original description is "Aspect et vigueur à peu près semblables à ceux du type, dont il diffère par ses fleurs blanches".

Additional citations: TEXAS: Ellis Co.: Moldenke & Woods 572 (S).

VITEX AGNUS-CASTUS var. CAERULEA Rehd.

Additional synonymy: Vitex agnus castus coerulea Hort. ex Beissner, Schelle, & Zabel, Handb. Laubh. 426, nom. nud. 1903. Vitex agnus castus var. coerulea Rehd. ex C. K. Schneid., Ill. Handb. Laubholz. 594. 1911.

Additional bibliography: C. K. Schneid., Ill. Handb. Laubholz. 594. 1911; Moldenke, Phytologia 8: 27. 1961; Ayres, Flow. Shrubs

Year-round Color 32. 1966.

Ayres (1966) refers to this taxon, without mentioning a varietal name, as "blue chaste-tree" and reports that it grows 6--10 feet tall, bearing blue flowers in summer, and can withstand temperatures as low as 20° F.

Additional citations: CULTIVATED: North Carolina: P. O. Schallert 351 (Hi--30276).

VITEX AGNUS-CASTUS var. DIVERSIFOLIA (Carr.) Schelle in Beissner, Schelle, & Zabel, Handb. Laubh. 426 [as "V. agnus castus diversifolia"]. 1903.

Synonymy: Vitex latiore serrato folio L'Obel, Pl. Stirp. Icon. 2: 139. 1581. Agnus folio serrato J. Bauhin, Hist. Pl. Univers. 1 (6): 205. 1650. Vitex latiore folia J. Bauhin, Pinax Theatr. Bot. 475. 1671. Agnus castus vulgaris diversifolia Carr., Rev. Hort. 42--43: 415. 1871. Agnus castus vulgaris var. diversifolia Carr. apud C. K. Schneid., Ill. Handb. Laubholz. 594, in syn. 1911. Vitex agnus-castus var. serrata Moldenke, Geogr. Distrib. Avicenn. 40, nom. nud. (1939); Am. Midl. Nat. 24: 753. 1940.

Additional bibliography: [in addition to the references given previously under V. agnus-castus var. serrata Moldenke] Carr., Rev. Hort. 42-43: 415. 1871; Beissner, Schelle, & Zabel, Handb. Laubh. 426. 1903; C. K. Schneid., Ill. Handb. Laubholz. 594. 1911; Moldenke, Phytologia 8: 27. 1961.

It appears that the taxon which I called V. agnus-castus var. serrata in my monograph must have its name changed to V. agnus-castus var. diversifolia, as indicated by the synonymy listed above. Schneider's description of it is "einige B'chen gezähnt".

The Beissner, Schell, & Zabel, Handb. Laubh. (1903) publication is cited by Schneider (1911) as "Schelle, H.d.D.D.G.", while Carrière's publication is often dated "1870-1871" or cited as volume "42" or "43" -- actually it is a combination of the two volumes in one and the page in question was published in 1871. His original description of the plant is "Se distingue du précédent [Agnus castus vulgaris] par ses folioles, les unes entières, les autres dentées; ses inflorescences aussi sont plus effilées, et ses fleurs sont violet rosé lilacé".

VITEX AGNUS-CASTUS f. LATIFOLIA (Mill.) Rehd.

Additional & emended synonymy: Agnus castus robusta Carr., Rev. Hort. 42-43: 416. 1871. Vitex agnus castus robusta Schelle in Beissner, Schelle, & Zabel, Handb. Laubh. 426, nom. nud. 1903. Vitex agnus-castus f. latifolia (Mill.) Rehd. ex Lombardo, Invent. Pl. Cult. Montevid. 235, sphalm. 1954. Vitex negundo macrophylla Mattoon, Pl. Buyers Guide, ed. 6, 294. 1958. Vitex agnuscastus latifolia Mattoon, Pl. Buyers Guide, ed. 6, 294. 1958. Vitex agnuscastus macrophylla Mattoon, Pl. Buyers Guide, ed. 6, 294, in syn. 1958. Vitex agnuscastus f. latifolia (Mill.) Rehd.

ex Lombardo, Arbust. & Arbustil. Pas. Publ. 43. 1961.

Additional & emended bibliography: Carr., Rev. Hort. 42-43: 416. 1871; C. K. Schneid., Ill. Handb. Laubholzsk. 594. 1911; Svenson, Brooklyn Bot. Gard. Record 22: 7. 1933; Lombardo, Invent. Pl. Cult. Montevid. 235. 1954; Moldenke in Humbert, Fl. Madag. 174: 77. 1956; Mattoon, Pl. Buyers Guide, ed. 6, 294. 1958; Anon., Kew Bull. Gen. Index 1929-1956, 293. 1959; Moldenke, Phytologia 8: 26. 1961; Lombardo, Arbust. & Arbustil. Pas. Publ. 43, 242, & 314. 1961; Belič & Čerin, Vestnik Slovensk. Kemij. Drust. 9: 33. 1962; Harkness, Phytologia 10: 269. 1964; Aul, N. Y. Herald Trib. Home & Gard. Sect. 2, April 3. 1966; Wayside Gardens, [Cat.] 1967: 179. 1967.

Additional illustrations: Wayside Gardens, [Cat.] 1967: 179 [in color]. 1967.

This plant has been collected in moist soil of pastures. Mattoon (1958) lists at least 33 horticultural sources for this plant. Belič & Čerin (1962) report that the flavone, casticin, is found in its seeds.

Carrière's original description of his variety robusta is as follows: "Arbrisseau très vigoureux, pouvant même former un petit arbre. Feuilles relativement grandes, à foliolis gris verdâtre, tomenteuses-feutrées, assez larges, entières. Inflorescence spiciforme, étroite, atteignant jusqu'à 50 centrimètres de longueur, peu ramifiée (deux courtes ramilles florifères) à sa base, garnie dans toute sa longueur de fleurs rose carné, relativement très-grandes (les plus grandes du genre). Très-belle plante."

Aul (1966) describes a pure white-flowered form, called "Silver Spire" horticulturally and offered to the trade by Wayside Gardens. Tentatively I am placing this in f. alba (West.) Rehd., but if it is really a form of f. latifolia rather than of typical V. agnus-castus, as appears from the description, it may need a new designation. He notes that its corollas are pure-white "in contrast to the cream to lavender whites that have been offered in the past". Wayside Gardens offer it at \$4.50 each, three for \$12.50, and \$45 per dozen.

Material of V. agnus-castus f. latifolia has been misidentified and distributed in herbaria as typical V. agnus-castus L.

Additional citations: SOUTH CAROLINA: Darlington Co.: B. E. Smith 1468 (H1--26017). GEORGIA: Bibb Co.: A. R. Moldenke 372 (Fg). LOUISIANA: Orleans Par.: Ewan 18258 (Ac). CULTIVATED: California: McClintock s.n. [July 14, 1943] (Mi). North Carolina: LeClair s.n. [July 26, 1937] (H1--8503).

VITEX AGNUS-CASTUS var. PSEUDO-NEGUNDO Hausskn. in Borm., Beih. Bot. Centralbl. 22 (2) [Pl. Strauss. 3]: 117--118. 1907.

Additional & emended bibliography: Borm., Beih. Bot. Centralbl. 22 (2) [Pl. Strauss. 3]: 117--118. 1907; Blakelock, Kew Bull. Misc. Inf. 1949: 539. 1949; Galil, Hort. Bot. Univ. Tel-aviv. Ind. Sem. 1964: 6 (1964) and 1966: 5. 1966; Kitamura, Results Kyoto Univ.

Scient. Exped. Karakoram 8: 132. 1966; Galil, Tankus, & Prusbul, Hort. Bot. Univ. Tel-aviv. Ind. Sem. 1967: 7. 1967.

A letter from Dr. Simone Vautier, dated August 27, 1964, enables me to correct the citation for the original publication of the trinomial accepted for this taxon. She says "A la page 193, à propos du Vitex agnus-castus var. pseudo-negundo (Hausskn.) in Borm. vous indiquez que la référence exacte, citée par Hand.-Maz [sic] vous manque: Plantae Strauss. 3: 117 (1907). La citation indiquée se trouve en effet dans un article de Bormüller J. dont le titre est 'Plantae Straussianae' pars 3, paru dans les Beihefte z. Centralblatt 1907 Band 22/2, pages 102 à 142. Il est probable que depuis 1955, vous ayez mis la main sur ce détail de la littérature des Vitex, cependant, je me permets à tout hasard de vous le signaler, si cela peut vous être utile."

Regel reports that this plant is very common on the banks of the rivers running from the mountains of Iraq. It is "very close to the Mediterranean Vitex agnus castus and can be considered as an Irano-Turanian variety of the Mediterranean element". A letter to me from Berta Cerin, dated April 29, 1962, announces her intention to work on the chemical constituents of the seeds of this variety. Its corollas are described as "blue" on the Gillett s.n. and as "violet" on the Rami s.n. specimens cited below. Blakelock (1949) cites Lazar 1593 from Iraq.

Additional citations: IRAQ: Gillett s.n. [Nat. Herb. Iraq 9432] (W-2274217); Rami s.n. [Nat. Herb. Iraq 9070] (W-2272901); C. Regel 66 (B).

VITEX AGNUS-CASTUS var. PSEUDO-NEGUNDO f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 5: 195. 1955; Moldenke, Résumé 158 & 475. 1959.

Personally, I do not like the use of trinomials and quadrinomials, but their use seems to be standard practice today.

VITEX AGNUS-CASTUS var. SERRATA Moldenke

It appears that the correct name for this taxon is V. agnus-castus var. diversifolia (Carr.) Schelle, which see.

VITEX AGNUS-CASTUS f. VARIEGATA Moldenke, f. nov.

Synonymy: Vitex agnus castus variegata Hort. ex Beissner, Schelle, & Zabel, Handb. Laubh. 426, nom. nud. 1903.

Haec forma a forma typica speciei foliolis albo-variegatis recedit.

This form differs from the typical form of the species in having its leaflets variegated with whitish patches.

VITEX ALTISSIMA L. f.

Additional & emended synonymy: Vitex altissima L. ex Moldenke, Phytologia 5: 197, in syn. 1955; Satyanarayan, Proc. Sympos. Humid Trop. Veg. 205. 1958. Vitex altissima L. ex Nair & Rehman, Bull. Bot. Gard. Lucknow 76: 21, fig. 24, sphalm. 1962.

Additional bibliography: Bocq., *Adansonia* 3: [Rev. Verbenac.] 253. 1863; W. A. Talbot, *Syst. List Trees Shrubs Bomb.* 161, 162, & 229. 1894; E. D. Merr., *Interpret. Rumph. Herb. Amboin.* 310 & 594. 1917; Gamble, *Fl. Madras* 1101--1103. 1924; Dastur, *Useful Pl. India* 221. 1952; Moldenke in Humbert, *Fl. Madag.* 174: 77. 1956; Satyanarayan, *Proc. Sympos. Humid Trop. Veg.* 205. 1958; Nayar, *Bull. Bot. Surv. India* 1: 124. 1959; Maun, *Philip. Journ. Forest.* 16: 108. 1960; Sebastine & Henry, *Bull. Bot. Surv. India* 3: 61, 1961; Moldenke, *Phytologia* 8: 62. 1961; Nair & Rehman, *Bull. Bot. Gard. Lucknow* 76: 21, fig. 24. 1962; Menninger, *Flow. Trees World* 285. 1962; Legris, *Trav. Sect. Scient. Inst. Franç. Pond.* 6: 184, 193--195, 202, 263, 501, 508, 522, & 586. 1963; Meher-Homji, *Trav. Sect. Scient. Inst. Franç. Pond.* 7 (1): 163. 1963; A. L. Moldenke, *Phytologia* 11: 70. 1964; Rao & Sastry, *Bull. Bot. Surv. India* 6: 160 & 164. 1964; Backer & Bakh., *Fl. Java* 2: 606. 1965; D. S. Rao, *Naturwiss.* 52 (10): 262. 1965; Qureshi, *Govt. Sarawak Sympos. Ecol. Res. Humid Trop. Veg.* 127 & 128. 1965; Anon., *Biol. Abstr.* 47: 2888. 1966.

Additional illustrations: Nair & Rehman, *Bull. Bot. Gard. Lucknow* 76: 21, fig. 24. 1962.

Nair & Rehman (1962) describe the pollen of this plant as subprolate, $28 \times 21 \mu$ (with a range of $26--28 \times 21--22 \mu$), the ectine surface faintly areolate. Rao & Sastry (1964) report the species as common in Mysore, India. Backer & Bakhuizen van den Brink (1965) assert that immature trees of *V. pinnata* L. are often mistaken for and identified as *V. altissima* in error. Dastur (1952) actually regards the name, *Vitex pinnata* L., as a synonym of *V. altissima*, but I have examined the actual type specimen, as I have stated previously, and it is certainly identical with what used to be called *V. pubescens* Vahl. Dastur states that *V. altissima* is known as "bulgi", "burnige", "milla", and "naviladi" in India, that its drupes are $1/4$ inch in diameter, purple, white-dotted, and borne on a persistent calyx, and that it is common in the Western Ghats in southern India where it is used for building Hindu temples. Its wood is olive-gray to olive-brown, durable under water, takes a good polish, and is excellent timber for furniture, cabinet-work, turnery, building and well construction, carts, the felloes of wheels, agricultural implements, and combs. A yellow dye is extracted from the wood.

The Ramaswamy 2897 distributed as *V. altissima* is actually *V. negundo* L.

VITEX ALTISSIMA var. *ZEYLANICA* (Turcz.) C. B. Clarke

Additional bibliography: Moldenke, *Phytologia* 5: 202--203. 1955; Moldenke, *Résumé* 167, 225, 380, 391, & 475. 1959.

Turczaninow's original description of this taxon is "V. caule ramisque tetragonis glabriusculis; foliis oppositis longe petiolatis, foliolis ternis breviter petiolulatis, oblongo-lanceolatis utrinque attenuatis integerrimis, utraque pagina punctis minutissimis exasperata, caeterum subglabris subtus pallidioribus; paniculis terminalibus geminis trichotomis pubescentibus, foliis multo

longioribus; cymis in ramis paniculae oppositis confertis; calycibus brevissime pedicellatis, obtuse 5 dentatis, corolla infundibuliformi subduplo brevioribus. Zeylan, Gardner No 674."

Additional citations: CEYLON: J. Fraser 178 (W-71640).

VITEX AMBONIENSIS Gürke

Additional bibliography: K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Moldenke, Phytologia 8: 28-29. 1961; Moldenke, Résumé Suppl. 12: 7. 1965.

Recent collectors describe this plant as a bush or shrub, 8 feet tall, a tree to 30 feet tall, or even as a "liana with long spreading branches covering a big area", the branches slender, bark dark-gray, roughened, with a brown slash, leaf-blades greenish, with a yellowish-brown tomentum, and the fruit green, mottled. The corollas are described as "yellowish, with a large blue lobe and blue hairs in the throat" (R. M. Harley 9424), "purple" (H. G. Faulkner 1853), or "upper petals blue-mauve, lower paler, throat yellow" (Wild, Goldsmith, & Muller s.n.). The plant has been found in flower in April and August, growing at altitudes of 10 to 2550 feet in the coastal bush or on recently burned savannas with scattered small bushes and trees. It is said to be "moderately common" in Tanganyika.

Additional citations: TANGANYIKA: H. G. Faulkner 1853 (S); R. M. Harley 9424 (S). KENYA: Edmund Heller 314 (W-634397). ANGOLA: Benguela: Campos de Andrada 74 (U1). RHODESIA: B. Goldsmith 79/62 (S); Wild, Goldsmith, & Muller s.n. [4.12.1964] (S).

VITEX AMBONIENSIS var. SCHLECHTERI Pieper

Additional bibliography: Moldenke, Phytologia 5: 206. 1955; Moldenke, Résumé 151 & 475. 1959.

VITEX ANDONGENSIS J. G. Baker

Additional bibliography: K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Moldenke, Phytologia 5: 206. 1955; Moldenke, Résumé 147, 381, & 475. 1959.

VITEX ANGOLENSIS Gürke

Additional bibliography: Gürke in Baum, Kunene-Sambesi Exped. 350. 1903; Moldenke, Phytologia 5: 207 (1955) and 5: 355. 1956; Moldenke, Résumé 147 & 475. 1959.

VITEX APPUNI Moldenke

Additional bibliography: Moldenke, Phytologia 5: 207-208. 1955; Moldenke, Résumé 76, 111, & 475. 1959.

Aristeguieta describes this plant as a tree, 6-8 m. tall, with blue flowers, blooming in February. Material has been misidentified and distributed in herbaria under the name V. orinocensis (Miq.) Huber.

Additional citations: VENEZUELA: Guárico: Aristeguieta 4527 (N).

VITEX AUREA Moldenke

Additional bibliography: Moldenke, *Phytologia* 5: 208--209. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 74, 103, 105, & 271, fig. 15, 1. 1956; Moldenke, *Résumé* 156 & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 105, fig. 15, 1. 1956.

VITEX AXILLARIS Wall.

Additional bibliography: Moldenke, *Phytologia* 5: 209. 1955; Moldenke, *Résumé* 166 & 475. 1959.

VITEX BALBI Chiov.

Additional bibliography: Moldenke, *Phytologia* 5: 209. 1955; Moldenke, *Résumé* 146 & 475. 1959.

VITEX BARBATA Planch.

Additional bibliography: Dalz., *Useful Pl. W. Trop. Afr.* 456. 1937; Moldenke, *Résumé* 133, 135--137, 140, & 475. 1959; Moldenke, *Phytologia* 8: 62. 1961; F. R. Irvine, *Woody Pl. Ghana* 761. 1961.

Irvine (1961) describes this plant as a tree, the young parts finely golden-pubescent, the leaves digitate, with 3--5 leaflets, the central one largest, 5 inches long, 2 inches wide, crenulate toward the apex, cuneate at the base, the flowers small, hairy, yellowish and blue-purple, in long-peduncled cymes that are minutely tomentellous, collected in flower from February to April, in fruit in April, growing in the savanna forest from Senegambia to Ghana. He cites Kitson 835. Dalziel (1937) says that in Gambia it is called "kutu-fingo" and in French Guinea the vernacular names are "as for V. chrysocarpa", including "ba-kudu-né".

VITEX BEFOTAKENSIS Moldenke

Additional bibliography: Moldenke, *Phytologia* 5: 209--210. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 75, 118--119, 121, & 272, fig. 18, 1 & 2. 1956; Moldenke, *Résumé* 157 & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 121, fig. 18, 1 & 2. 1956.

VITEX BENTHAMIANA Domin

Additional bibliography: Warb. in Engl., *Bot. Jahrb.* 13: 428. 1891; Moldenke, *Phytologia* 8: 29. 1961.

VITEX BENUENSIS Engl.

Additional bibliography: Moldenke, *Phytologia* 5: 211. 1955; Moldenke, *Résumé* 139 & 475. 1959.

VITEX BEQUAERTI DeWild.

Additional bibliography: Moldenke, *Phytologia* 5: 355. 1956; Moldenke, *Résumé* 142 & 475. 1959.

VITEX BERAVIENSIS Vatke

Synonymy: Vitex bevariensis Vatke ex Moldenke in Humbert, *Fl.*

Madag. 174: 95, sphalm. 1956.

Additional bibliography: Moldenke, *Phytologia* 5: 211—213. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 72, 73, 95—99, & 272, fig. 13, 2—4. 1956; Moldenke, *Résumé* 157, 381, 384, & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 95, fig. 13, 2—4. 1956.

VITEX BERAIVIENSIS var. *ACUMINATA* Moldenke

Additional bibliography: Moldenke, *Phytologia* 5: 213. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 73, 95, 98—99, & 272, fig. 13, 7. 1956; Moldenke, *Résumé* 157, 381, 384, & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 95, fig. 13, 7. 1956.

VITEX BERAIVIENSIS f. *PILOSA* Moldenke

Synonymy: *Vitex beraviensis* var. *pilosa* Moldenke in Humbert, *Fl. Madag.* 174: 95, sphalm. 1956.

Additional bibliography: Moldenke, *Phytologia* 5: 213—214. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 72, 95, 97, 98, & 272, fig. 13, 5. 1956; Moldenke, *Résumé* 157 & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 95, fig. 13, 5. 1956.

VITEX BERAIVIENSIS f. *VILLOSA* Moldenke

Synonymy: *Vitex beraviensis* var. *villosa* Moldenke in Humbert, *Fl. Madag.* 174: 95, sphalm. 1956.

Additional bibliography: Moldenke, *Phytologia* 5: 214. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 73, 95, 98, & 272, fig. 13, 6. 1956; Moldenke, *Résumé* 157 & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 95, fig. 13, 6. 1956.

VITEX BETSILIENSIS Humbert

Bibliography: Humbert, *Not. Syst.* 8: 22. 1939; Moldenke, *Phytologia* 5: 214—215. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 73, 74, 100—102, & 272, fig. 14, 6 & 7. 1956; Moldenke, *Résumé* 157, 225, & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 101, fig. 14, 6 & 7. 1956.

VITEX BETSILIENSIS ssp. *BARORUM* Humbert

Bibliography: Humbert, *Not. Syst.* 8: 23—24. 1939; Moldenke, *Phytologia* 5: 215. 1955; Moldenke in Humbert, *Fl. Madag.* 174: 74, 101, 102, & 272, fig. 14, 8 & 9. 1956; Moldenke, *Résumé* 157 & 475. 1959.

Illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 101, fig. 14, 8 & 9. 1956.

VITEX BOGALENSIS Wernham

Additional bibliography: Moldenke, *Phytologia* 5: 215. 1955; Moldenke, *Résumé* 139 & 475. 1959.

VITEX BOJERI Schau.

Additional bibliography: Moldenke, Phytologia 5: 355--356. 1956; Moldenke in Humbert, Fl. Madag. 174: 74, 75, 103--106, & 272, fig. 15, 2 & 3. 1956; Moldenke, Résumé 157, 251, 381, 383, & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 105, fig. 15, 2 & 3. 1956.

VITEX BOJERI var. SUBORBICULARIS Moldenke

Bibliography: Moldenke, Phytologia 3: 431 (1951) and 5: 217. 1955; Moldenke in Humbert, Fl. Madag. 174: 74, 105, 106, & 272, fig. 15, 4. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 105, fig. 15, 4. 1956.

VITEX BRACTEATA S. Elliot

Additional bibliography: Moldenke, Phytologia 5: 217--218. 1955; Moldenke in Humbert, Fl. Madag. 174: 75, 119--121, & 272, fig. 18, 3. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 121, fig. 18, 3. 1956.

VITEX BREVILABIATA Ducke

Additional bibliography: Moldenke, Phytologia 8: 29. 1961.

An isotype of this species, Ducke s.n. [Herb. Rio de Janeiro 311], in the herbarium at the Botanisches Museum at Berlin, was photographed there by Macbride as his type photograph number 17559, but is now destroyed.

Additional citations: BRAZIL: Pará: Ducke s.n. [Herb. Rio de Janeiro 311; Macbride photos 17559] (N--photo of isotype, W--photo of isotype).

VITEX BREVIPETIOLATA Moldenke

Additional bibliography: Moldenke, Phytologia 5: 220. 1955; Moldenke, Résumé 111 & 475. 1959.

VITEX BUCHANANII J. G. Baker

Additional bibliography: Moldenke, Phytologia 8: 62. 1961.

Best describes this plant as a large herb or shrub with several erect stems from a single rootstock, the stems green, smooth, and rather brittle, "not woody like a shrub", the leaves medium-green above, rough, paler beneath, the flowers white, the anthers pale-brown, and the entire plant faintly aromatic and reminiscent of celery, growing in cleared woodland, in well-drained rocky black soil in full exposure to the sun, at 3250 feet altitude, blooming in February.

Additional citations: RHODESIA: E. B. Best 189 (S).

VITEX BUCHANANII var. QUADRANGULA (Gürke) Pieper

Additional bibliography: K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Moldenke, Phytologia 8: 29. 1961.

VITEX BUCHNERI Gürke

Additional bibliography: Moldenke, Phytologia 5: 303 (1955) and 5: 356. 1956; Moldenke, Résumé 142, 147, & 475. 1959.

The two collections cited below were erroneously cited by me in Phytologia 5: 303 (1955) as V. congolensis DeWild. & Th. Dur.; their petiolules seem to be definitely elongate.

Additional citations: CONGO LEOPOLDVILLE: Claessens 675 (N, S); Louis 1761 (N).

VITEX BUDDINGII Moldenke

Bibliography: Moldenke, Phytologia 4: 59—60 (1952) and 5: 222—223. 1955; Moldenke, Résumé 194 & 475. 1959.

VITEX BURMENSIS Moldenke

Bibliography: Moldenke, Phytologia 8: 30—31. 1961; Moldenke, Biol. Abstr. 37: 1062. 1962; Moldenke, Résumé Suppl. 3: 17. 1962.

VITEX CAESPITOSA Exell

Additional bibliography: Moldenke, Phytologia 5: 223. 1955; Moldenke, Résumé 147 & 475. 1959.

VITEX CALOTHYRSA Sandw.

Additional bibliography: Moldenke, Biol. Abstr. 30: 1704. 1956; Anon., Kew Bull. Gen. Index 1929—1956, 293. 1959; Moldenke, Phytologia 8: 31. 1961.

An isotype of this species, Spruce 3356, in the herbarium of the Botanisches Museum at Berlin, was photographed there by Macbride as his type photograph number 17564, but is now destroyed.

Additional citations: VENEZUELA: Bolívar: Spruce 3356 [Macbride photos 17564] (W—photo of isotype). BRAZIL: Amazonas: Ducke 505 (W—1693509).

VITEX CANESCENS Kurz

Additional & emended bibliography: Craib, Kew Bull. Misc. Inf. 9: 443. 1911; Fletcher, Kew Bull. Misc. Inf. 1938: 431 & 433—434. 1938; Anon., Kew Bull. Gen. Index 1929—1956, 293. 1959; Moldenke, Phytologia 8: 31—32. 1961; Legris, Trav. Sect. Scient. Inst. Franç. Pond. 6: 508 & 586. 1963.

Recent collectors describe this plant as a tree or small tree, 30 m. tall, "downy in all parts", the trunk 1 1/2 feet in diameter, rather rough, the bark gray, peeling off in irregular patches, the inflorescences to 1 m. long, the corollas cream-white, yellow in the throat (Kingdon-Ward 21882), the fruit black, growing at 2000—3000 m. altitude, blooming in March, fruiting in June and July.

Additional citations: INDIA: Assam: Koelz 28165 (M1). BURMA: Upper Burma: Kingdon-Ward 21882 (Bm). THAILAND: Kostermans 1248 (W—2039892).

VITEX CAPITATA Vahl

Additional synonymy: Vitex capitatus Vahl ex Moldenke, Résumé

Suppl. 7: 10, in syn. 1963.

Additional bibliography: Bocq., *Adansonia* 3: [Rev. Verbenac.] 253. 1863; Ettingsh., K. Akad. Wiss. Wien Denkschr. 28: 219 [Fos-sile Fl. Bilin 2: 21]. 1868; Moldenke in Cheesman, Fl. Trin. & Tob. 2: 411--413. 1955; Moldenke, Verb. 30--32. 1955; Moldenke, Phytologia 8: 32. 1961; Moldenke, Résumé Suppl. 7: 10. 1963.

Recent collectors describe this plant as a tree, 3.5--10 m. tall, the trunk 10 cm. in diameter, the leaves subcoriaceous, deep-green above, pale-green beneath, the buds greenish-white, the immature fruit green, growing along rivers on wooded slopes bordering savannas and on granitic outcrops, at 300--600 m. altitude, fruiting in August, and called "guaratara" or "guatara".

An isotype specimen, Ryan s.n., deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris, was photographed there by Macbride as his type photograph number 39499. The type of V. bignonioides, Bonpland 741, deposited in the herbarium of the Botanisches Museum at Berlin, was photographed there by Macbride as his type photograph number 17558, but is now destroyed.

Additional citations: TRINIDAD: Ryan s.n. [1796; Herb. Willdenow 11712; Herb. Jussieu 5057; Macbride photos 39499] (W--photo of isotype). VENEZUELA: Anzoategui: H. Pittier 14884 (W--1857801). Apuré: Vélez 2688 (Ve). Aragua: Bonpland 741 [Macbride photos 17558] (W--photo). Bolívar: J. A. Steyermark 86791 (Fg, N), 94269 (Lw). Guárico: Aristeguieta 4183 (Ve--45591); Burkart 16206 (Ve). Monagas: F. D. Smith 230 (W--2121473); Wurdack & Monachino 39451 (N). SURINAM: Irwin, Prance, Söderstrom, & Holmgren 55514 (N).

VITEX CARBUNCULORUM Smith & Ramas

Additional bibliography: Moldenke, Phytologia 5: 264--265. 1955; Moldenke, Résumé 166 & 475. 1959.

Recent collectors have described this species as a tree or tall tree, 7 m. tall, the bark 0.5 cm. thick, the wood white, leaves green, corollas yellowish (Bunpheng 1148), growing in evergreen forests, at an altitude of 350 m., blooming in March, fruiting in June, and called "makang". Bunpheng refers to it as "common" in open spaces on plains.

Additional citations: THAILAND: Bunpheng 1148 [Herb. Roy. Forest Dept. 26233] (Z); K. Larsen 9835 (Lw).

VITEX CARVALHI Gürke

Additional bibliography: Moldenke, Phytologia 5: 265. 1955; Moldenke, Résumé 146, 151, & 475. 1959.

VITEX CAULIFLORA Moldenke

Bibliography: Moldenke, Phytologia 3: 432 (1951) and 5: 265--266. 1955; Moldenke in Humbert, Fl. Madag. 174: 73, 99--101, & 272, fig. 14, 1 & 2. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 101, fig.

14, 1 & 2. 1956.

VITEX CAULIFLORA var. LONGIFOLIA Moldenke

Bibliography: Moldenke, Phytologia 3: 433 (1951) and 5: 266. 1955; Moldenke in Humbert, Fl. Madag. 174: 73, 100, 101, & 272, fig. 14, 4 & 5. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 101, fig. 14, 4 & 5. 1956.

VITEX CAULIFLORA var. VILLOSISSIMA Moldenke

Bibliography: Moldenke, Phytologia 3: 433 (1951) and 5: 266. 1955; Moldenke in Humbert, Fl. Madag. 174: 73, 99--101, & 272, fig. 14, 3. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 101, fig. 14, 3. 1956.

VITEX CESTROIDES J. G. Baker

Synonymy: Vitex cestroides J. G. Baker ex Moldenke in Humbert, Fl. Madag. 174: 85. 1956.

Additional bibliography: Moldenke, Phytologia 5: 266--267. 1955; Moldenke in Humbert, Fl. Madag. 174: 72, 83--85, & 272, fig. 11, 1--3. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 85, fig. 11, 1--3. 1956.

VITEX CHARIENSIS A. Chev.

Additional bibliography: Moldenke, Phytologia 5: 267. 1955; Moldenke, Résumé 140 & 475. 1959.

VITEX CHARIENSIS var. LATIFOLIA A. Chev.

Additional bibliography: Moldenke, Phytologia 5: 267--268. 1955; Moldenke, Résumé 140 & 475. 1959.

VITEX CHRYSLERIANA Moldenke

Additional bibliography: Moldenke, Phytologia 5: 268--269. 1955; Moldenke, Résumé 111 & 475. 1959.

VITEX CHRYSOCARPA Planch.

Additional bibliography: Dalz., Useful Pl. W. Trop. Afr. 456. 1937; Moldenke, Phytologia 5: 269 (1955) and 5: 356. 1956; Moldenke, Résumé 133, 135--138, 142, 148, 382, 391, & 475. 1959; F. R. Irvine, Woody Pl. Ghana 761. 1961; Huber in Hutchinson & Dalz., Fl. W. Trop. Afr., ed. 2, 2: 445 & 448. 1963.

Dalziel (1937) says "In Togo the people use the wood to make fishing gear". He records the additional vernacular name "ba-kudu-né", as well as "balamagnian kan". The first of these, he notes, probably refers also to V. barbata Planch. Cooper records "kpar-seh" and describes the plant as a tree, 40--60 feet tall, and the trunk 10--18 inches in diameter, with buttresses.

Huber (1963) regards V. pseudochrysocarpa Pieper as a synonym and refers to the plant as a "Small shrub or spreading tree, especially on banks of rivers; indumentum mostly pale yellow,

flowers violet, in peduncled cymes". He cites Chevalier 2756 & 2765, Jaeger 6, Vuillet 611, and Waterlot 1116 from Mali, Chevalier 2768 and Pobéguin 232 from Guinea, Serv. For. 2408 & 2736 from Ivory Coast, Adams 4567, Dalziel 2, Kitson 688, Vigne FH.1688 and Williams 150 from Ghana, Aubréville 78d from Togo, Chevalier 24394 from Niger, Barter 388 & 1214, Dalziel 115, and Onochie FHI. 18669 & 40236 from Northern Nigeria, and Kennedy 58, Obaseki FHI. 23825, and T. Vogel 142 from Southern Nigeria.

Irvine (1961) describes the plant as "A spreading tree, bark smooth, young parts dense yellow-pubescent; leaves 3--5 foliolate, leaflets 4 x 2 in., central largest, obovate or oblanceolate, yellow-hairy below, cuspidate, upper half toothed; flowers (Mar.--Apr.) small, blue-purple, hairy, 1/2 in. long, few, in pedunculate axillary cymes; fruits (Apr.--May, Aug.) 1/2 -- 3/4 in. diam., yellow-velvety, becoming glabrous and black." He gives its distribution as "S. Leone to Nigeria" and cites from Ghana (where he says it is common in the Fringing Forest zone): Anderson 25, Dalziel s.n., Johnson 1113, Kitson 687, 688, 729, & 897, Rea 1665, Vigne 1688 & 3330, and Ll. Williams 150.

Additional citations: LIBERIA: G. P. Cooper 67 [Herb. Mus. Yale School For. 13717] (W-1378347).

VITEX CHRYSOMALLUM Steud.

Additional bibliography: Moldenke in Humbert, Fl. Madag. 174: 76, 77, 135--139, 271 & 272, fig. 21, 6. 1956; Moldenke, Résumé 157, 251, 381, 382, 386, & 475. 1959; Moldenke, Phytologia 8: 32. 1961.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 135, fig. 21, 6. 1956.

VITEX CHRYSOMALLUM var. LONGICALYX Moldenke

Bibliography: Moldenke, Phytologia 3: 431 (1951) and 5: 271--272. 1955; Moldenke in Humbert, Fl. Madag. 174: 77, 138, 139, & 272, fig. 22, 3 & 4. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 139, fig. 22, 3 & 4. 1956.

VITEX CHRYSOMALLUM var. TOMENTELLA Moldenke

Bibliography: Moldenke, Phytologia 3: 431--432 (1951) and 5: 272. 1955; Moldenke in Humbert, Fl. Madag. 174: 77, 138, 139, & 272, fig. 22, 1 & 2. 1956; Moldenke, Résumé 157 & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 139, fig. 22, 1 & 2. 1956.

VITEX CILIO-FOLIOLATA A. Chev.

Additional bibliography: Moldenke, Phytologia 5: 272--273. 1955; Moldenke, Résumé 137 & 475. 1959.

VITEX COCHINCHINENSIS P. Dop

Additional bibliography: Moldenke, Phytologia 5: 356. 1956; Mol-

denke, Résumé 177 & 475. 1959.

VITEX COFASSUS Reimw.

Additional synonymy: Vitex cofassus Reniv. & Bl. ex Moldenke, Résumé Suppl. 3: 42, in syn. 1962. Vitex confassus Reimw. ex Moldenke, Résumé Suppl. 3: 42, in syn. 1962. Vitex cofassum Reimw. ex Moldenke, Résumé Suppl. 7: 10, in syn. 1963.

Additional & emended bibliography: E. D. Merr., Interpret. Rumph. Herb. Amb. 452 & 594. 1917; H. J. Lam in Engl., Bot. Jahrb. 59: 27--28 & 92. 1924; Kanehira, Fl. Micrones. 343, 344, & 457. 1933; Moldenke, Phytologia 8: 32--34. 1961; Moldenke, Résumé Suppl. 3: 42 (1962), 7: 10 (1963), and 12: 8. 1965; Backer & Bakh., Fl. Java 2: 604. 1965; T. C. Whitmore, Guide Forests Brit. Solomon Isls. 117, 133, 142, & 205. 1966; J. C. Saunders, CSIRO Land Research Ser. 17: 174. 1967.

Recent collectors describe this species as a small tree, 5 m. tall, or a tree 10--30 m. tall, the trunk 50 cm. in diameter, the bark close, pale brownish-gray, buds white, and the fruit fleshy, dark-purplish or black when ripe. Backer & Bakhuizen van den Brink (1965) describe it as follows: "Leaves glabrous or subglabrous on both surfaces, ovate-oblong, rather long-acuminate, dark green with paler nerves above, gland-dotted beneath, 10--30 cm by 3--10.5 cm; petiole 1--8 cm. Panicles terminal and in the higher axils, combined into a 15--30 cm long terminal panicle, finely pubescent; cymes 1.5--3 cm (inclusive of 6--15 cm peduncle) [sic!]; calyx pubescent, 1 3/4 -- 2 mm high; corolla bluish violet, outside covered with sessile glands, inside (from the insertion of the stamens up to the base of the lower lip) pubescent; tube 4--5 mm; median segment of lower lip 5--6 mm; bases of filaments villous; drupe depressed-globose, dark violet, 3/4 -- 1 1/4 cm diam.....native to eastern Malesia; in Java cultivated in the Bogor Botanic Garden; also found as an escape near Bogor".

Whitmore (1966) states that this tree is found as a common big tree throughout the Solomon Islands, but not on Santa Cruz, and not in pure stands; the wood used locally to make paddles. It is called "aiululu" and "fata" there. He cites Rechinger 3748 and Waterhouse 29. Other vernacular names recorded for it are "molkewie" and "moluli". Brass found it "frequent in the canopy layer" in Papua. Saunders (1967) refers to it as common in tall alluvium forests and in mixed deciduous hill forests in New Guinea, and notes that it is occasional in irregular tall alluvium forests, tall evergreen fan forests at low altitudes, tall mixed deciduous forests, foothill and mud slope hill forests at low and medium altitudes, and in small-crowned hill forests.

The corollas are described as "blue-purple" on M. S. Clemens 10443, "violet" on Brass 21950, and "lavender" on Brass 21909. The species has been found in anthesis in July and in fruit in March. The Lam (1924) reference is often cited as "1925", but the latter date is merely the title-page date for the volume; the pages cited were published in 1924.

Additional citations: WESTERN PACIFIC ISLANDS: MARIANA ISLANDS: Agiguan: Kondo s.n. [June 3, 1952] (Bi). PALAU ISLANDS: Palau: Hosokawa 7051 (Mi). INDONESIA: GREATER SUNDA ISLANDS: Celebes: Waturandang 16 [Boschproefst. Cel/V.134] (Bi). MOLUCCA ISLANDS: Amboina: Hallalu 4 [Boschproefst. B.B.19510] (Bi). MICRONESIA: CAROLINE ISLANDS: Babelthuap: Hosokawa 7051, in part (Bi). Garo-dokku: Takamatsu 1226 (Bi), 1268 (Bi), 1363 (Bi). MELANESIA: NEW GUINEA: Northeastern New Guinea: Cavanaugh 4052 (Bi); M. S. Clemens 10443 (Mi); Fryar 3347 (Bi), 4000 (Bi); Hoogland 4869 (W—2214117); McViegh & Ridgwell 7366 (Bi); Womersley 3313 (Bi). Papua: Brass 21909 (A), 21950 (A), 29192 (W—2390813). BISMARK ARCHIPELAGO: New Britain: Floyd 6633 (Bi); Womersley & Kazakoff 7082 (Bi). New Hannover: Dissing, Køie, & Olsen 1978 (Cp, Z). Island undetermined: Dissing, Køie, & Olsen 2003 (Ac, Cp). SOLOMON ISLANDS: Bougainville: Kajewski 1533 (Bi), 1843 (Bi). Guadalcanal: Kajewski 2387 (Bi), 2489 (Bi), 2605 (Bi). Malaita: Kajewski 2381 (Bi). San Cristoval: Brass 2821 (Bi). Ysabel: Brass 3154 (Bi), 3272 (Bi). Island undetermined: Waterhouse 29 [Herb. Mus. Yale Sch. For. 21160] (Bi). MOUNTED ILLUSTRATIONS: H. N. Moldenke color slide 471 (Z).

VITEX COFASSUS f. ANOMALA Moldenke

Additional bibliography: Moldenke, *Phytologia* 5: 279—280. 1955; Moldenke, *Résumé* 195, 199, 225, & 475. 1959.

VITEX COFASSUS var. PUBERULA H. J. Lam

Additional bibliography: Moldenke, *Phytologia* 8: 34. 1961.

Additional citations: MELANESIA: NEW GUINEA: Northeastern New Guinea: J. H. Barrett s.n. [Pulsford 18] (Bi).

VITEX COLUMBIENSIS Pittier

Additional bibliography: Moldenke, *Biol. Abstr.* 30: 1704 & 3551. 1956; Moldenke, *Phytologia* 8: 34. 1961.

VITEX COMPRESSA Turcz.

Additional bibliography: Moldenke in Cheesman, *Fl. Trin. & Tob.* 2: 411 & 412. 1955; Moldenke, *Verb.* 30 & 31. 1955; Moldenke, *Phytologia* 8: 62. 1961.

Turczaninow's original description of this plant is as follows: "V. ramis acute tetragonis compressis glabris, faciebus canaliculatis nervosis; foliis oppositis petiolatis, foliolis 5 oblongo-lanceolatis, obtuse acuminatis, basi in petiolum parum decurrentibus integerrimis glabris, subtus vix pallidioribus, exterloribus [sic] saepe minoribus ellipticis; paniculis axillaribus tenuissime puberulis, foliis brevioribus; calyce breviter 5 dentato, tubo corollae campanulato-infundibuliformi duplo brevior. Flores lilacini. Ocana, prope Eullanada, alt. 3500 ped. Schlim No 518." An isotype, deposited in the herbarium of the Co. servatoire et Jardin Botaniques at Geneva, was photographed there by Macbride as

his type photograph number 24704.

Recent collectors describe this plant as a tree, 8 m. tall, the leaves rich-green above, dull beneath, and the calyx, pedicels, and rachis gray-green, fruiting in September. The corolla is described as "lavender" on J. A. Steyermark 86381. Additional vernacular names are "alaso abo", "guaratatare", "guarataro", "pachaca", "torumillo", and "waro koeli djamaro". Stahel 349 is accompanied by a wood voucher.

Material of this species has been misidentified and distributed in herbaria as V. orinocensis H.B.K. and as Crataeva gynura L.

Additional citations: CURACAO: Arnoldo 2274 (S). COLOMBIA: Magdalena: Dugand 5663 (W--2369332); H. H. Smith 2107 (Mi, Ws). Norte de Santander: Schlim 518 [Macbride photos 24704] (W--photo of isotype). VENEZUELA: Anzoategui: H. Pittier 15069 (W--1833214). Bolívar: Bernardi 7400 (N, Ve); E. L. Little 17596 (Ve), 17618 (Ve); J. A. Steyermark 86381 (Fg, N, Ve--51115, W--2426084), 86621 (Fg, N), 86722 (Fg, N, Ve), 86916 (Fg, N), 94239 (Lw). Guárico: Aristeguieta & Agostini 6407 (Rf). Lará: Badillo 469 (Ve--18314). Yaracuy: Bernardi 6955 (Ve). State undetermined: H. Pittier 15118 [Cantaura] (Ve--1762). BRITISH GUIANA: Tutin 14 (W--1743362), 333 (W--1743519), 334 (W--1743520). SURINAM: Stahel 349 (Ws, Ws).

VITEX CONGENSIS A. Chev.

Additional bibliography: Moldenke, *Phytologia* 5: 300. 1955; Moldenke, *Résumé* 142, 419, & 475. 1959.

VITEX CONGESTA Oliv.

Additional bibliography: Moldenke, *Phytologia* 5: 300--301. 1955: Moldenke in Humbert, *Fl. Madag.* 174: 76, 129, 131--132, & 272, fig. 20, 6 & 7. 1956; Moldenke, *Résumé* 157, 274, 356, & 475. 1959.

Additional illustrations: Moldenke in Humbert, *Fl. Madag.* 174: 129, fig. 20, 6 & 7. 1956.

VITEX CONGOLENSIS DeWild. & Th. Dur.

Additional bibliography: K. Schum. in Just, *Bot. Jahresber.* 28 (1): 497. 1902; Moldenke, *Phytologia* 8: 34. 1961; Moldenke, *Résumé Suppl.* 12: 7. 1965.

Schumann (1902) is of the opinion that this taxon is conspecific with V. ferruginea Schum. & Thonn. The vernacular name, "tshikamba-tshitôma" is recorded for it from Angola, where the plant has been collected at 1100 meters altitude. In the Congo it has been found at 470 m. altitude by Louis. Material has been misidentified and distributed in herbaria as V. rufa A. Chev. The Louis 1761 and Claessens 675, cited by me as V. congolensis in my monograph, are both actually V. buchneri Gürke because of their obvious elongated petiolules.

Additional citations: LIBERIA: Dinklage 2194 (B). CONGO LEOPOLDVILLE: Louis 13889 (B). ANGOLA: Benguela: Gossweiler 12538 (UL). Lunda: Machade s.n. [Ang. Veg. 131; Gossweiler 87] (UL).

VITEX CONGOLENSIS var. GILLETII (Gürke) Pieper

Additional bibliography: Moldenke, Phytologia 5: 303. 1955; Moldenke, Résumé 142, 383, & 475. 1959.

VITEX CORDATA Aubrév.

Additional bibliography: Moldenke, Phytologia 5: 305. 1955; Moldenke, Résumé 133, 136, & 475. 1959.

VITEX COURSI Moldenke

Bibliography: Moldenke, Phytologia 3: 433--434 (1951) and 5: 306. 1955; Moldenke in Humbert, Fl. Madag. 174: 76, 128--130, & 272, fig. 20, 1 & 2. 1956; Moldenke, Résumé 157, 382, & 475. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 129, fig. 20, 1 & 2. 1956.

VITEX CRENATA A. Chev.

Additional bibliography: Moldenke, Phytologia 5: 306--307. 1955; Moldenke, Résumé 140 & 475. 1959.

VITEX CUSPIDATA Hiern

Additional bibliography: K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Moldenke, Phytologia 5: 307 (1955) and 5: 357. 1956; Moldenke, Résumé 142, 147, & 475. 1959.

VITEX CYMOSA Bert.

Additional & emended synonymy: Vitex cujabensis Mart. ex Benth., Bot. Voy. Sulphur 155. 1846. Vitex cimosa Bert. ex Angely, Fl. Paran. 7: 13, sphalm. 1957. Vitex cymosa Benth., in herb.

Additional bibliography: Benth., Bot. Voy. Sulphur 155. 1846; Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 199. 1893; Le Cointe, Amaz. Bras. III Arv. & Plant. Uteis, ed. 2, 456--457. 1947; Moldenke, Phytologia 5: 357. 1956; Angely, Fl. Paran. 7: 13. 1957; Tamayo, Bol. Soc. Venez. Cienc. Nat. 23: 295. 1963; Moldenke, Résumé Suppl. 12: 2. 1965; Teague, Anal. Mus. Hist. Nat. Montev., ser. 2, 7 (4): 45. 1965.

An isotype, Balbis s.n., deposited in the herbarium of the Conservatoire et Jardin Botaniques at Geneva, was photographed there by Macbride as his type photograph number 7883. Additional vernacular names recorded for the species are "jaramantaia", "tarumaã", "tarumã do alagado", "tarumã do igapó", "tarumã preto", and "totumillo". Le Cointe (1947) says that this tree is found on the inundated margins of lakes and rivers, "floresce despido de folhagem, logo que os ramos emergem da água depois da enchente anual"; the wood being "amareol-pardacenta", and the "fruto da forma e do tamanho de uma azeitona, doce, mas deixando na boca um

sabor acre". Cardona found the tree growing at 300 meters altitude. Black describes it as a tree, 66 feet tall, with a trunk diameter of 1 1/2 feet, and that an "evil smelling stagnant liquid ran out of the log after it was sawed". The species has also been found growing on hills. The corollas are described as "blue" on Arnoldo 1624. Teague (1965) reports that the wood is used for shelves and general carpentry, and medicinally as an antiluetic. He cites Teague 242 & 662 and Herb. Rojas s.n.

Material of V. cymosa has been misidentified and distributed in herbaria as V. orinocensis var. multiflora (Miq.) Huber, Godmania aesculifolia (H.B.K.) Standl., and Tabebuia sp.

Additional citations: CURACAO: Arnoldo 1624 (W—2110663), 2275 (N, N, S). COLOMBIA: Atlántico: Dugand 4452 (W—246376). Magdalena: Balbis s.n. [Bertero 2755; Macbride photos 7883] (W—photo of isotype); Haught 4039 (W—1708846); H. H. Smith 1936 (Mi, Ws). Putumayo: Cuatrecasas 11249 (W—1799678, W—1799679). Tolima: Garcia-Barriga 3103 (W—1593364). VENEZUELA: Bolívar: Cardona 2119 (Ve). BRAZIL: Amazonas: Ducke 476 (W—1693480); Fröes 26214 (W—2248462), 26506 (N); Krukoff 4502 (W—1668301). Matto Grosso: Prance, Silva, & Murça Pires 59124 [L. S. 120] (N). Pará: G. A. Black "Project 154 F-30" (W—2250585); Black, Egler, Cavalcante, & Silva 57-19478 (S). PARAGUAY: Pedersen 4232 (W—2283729).

VITEX DEGENERIANA Moldenke

Additional bibliography: Moldenke, *Phytologia* 5: 313—314. 1955; Moldenke, *Résumé* 111 & 475. 1959; Moldenke, *Résumé Suppl.* 12: 5. 1965.

Recent collectors describe this plant as a shrub, 0.5—2.25 m. tall, the calyx-cup green, flowering in August, growing at 350—550 m. altitude in areas where much of the forest has been cleared for cultivation and is in various secondary stages and where the immediate vicinity has two types of xeromorphic woodland and gallery forest along brooks. On Eiten & Eiten 5419 the flowers are described as "upper 2 lobes of the corolla white, the 2 laterals whitish-violet, the lower light-violet, the filaments white, and the anthers purple"; on their no. 5422 there were "violet lines on the corolla leading into the white throat of the corolla-tube, the filaments white below, violet above, the anthers blackish-purple, the style white below, reddish-purple at the tip".

Additional citations: BRAZIL: Maranhão: Devereux 10 (W—2445194); Eiten & Eiten 5419 (W—2445206), 5422 (W—2445220).

VITEX DENTATA Klotzsch

Additional bibliography: Moldenke, *Phytologia* 5: 314. 1955; Moldenke, *Résumé* 151 & 475. 1959.

VITEX DINKLAGEI Gürke

Additional bibliography: Moldenke, Phytologia 5: 314--315. 1955; Moldenke, Résumé 139 & 475. 1959.

VITEX DIVARICATA Sw.

Additional synonymy: Vitex divaricata DC. ex Moldenke, Résumé Suppl. 13: 7, in syn. 1966.

Additional bibliography: Griseb., Cat. Pl. Cub. 216. 1866; Moldenke in Cheesman, Fl. Trin. & Tob. 2: 411 & 413--414. 1955; Moldenke, Verb. 30 & 32--33. 1955; Moldenke in Humbert, Fl. Madag. 174: 93 & 272. 1956; Moldenke, Phytologia 8: 35. 1961; Menninger, Flow. Trees World 284--285. 1962; Little & Wadsworth, U. S. Forest Serv. Agric. Handb. 249: 486--487. 1964; Moldenke, Résumé Suppl. 13: 7. 1966; Steyermark & Agostini, Act. Bot. Venez. 2 (2): 13, 14, & 17. 1966.

Additional illustrations: Little & Wadsworth, U. S. Forest Serv. Agric. Handb. 249: 487. 1964.

Recent collectors describe this plant as a much-branched tree, 15--45 feet tall, with a trunk diameter of 14 inches at breast height, the fruit green when immature, black when ripe, growing in mossy forests or in secondgrowth mountain rainforests, at 500 to 4600 feet altitude, flowering and fruiting in July. Webster, Ellis, & Miller refer to it as "common" in Puerto Rico, but Box calls it "very rare in mesophytic forest approaching ravine forest in character". The corollas are described as "blue" on Alain 9439 and on Webster, Ellis, & Miller 8733 and as "violet-blue" on Proctor 17797. The Cardona 2382, distributed as Vitex divaricata, is not verbenaceous.

Little & Wadsworth (1964) give a very excellent description of this tree. They describe it as a "Small to medium-sized tree with much-fissured light brown bark, rough and shreddy and separating in strips, further distinguished by: (1) opposite leaves mostly compound with 3 elliptic leaflets or often only 1 or sometimes 2, the end one larger than the others; (2) numerous showy pale purplish-blue flowers $3/8$ inch long and $1/2$ -- $5/8$ inch across the 5 unequal corolla lobes, in lateral branching clusters; and (3) black egg-shaped fleshy fruits $1/2$ inch long, with cup-like calyx at base.

"A deciduous tree 20--65 feet high and to 2 $1/2$ feet in trunk diameter, with rounded crown. The inner bark is light brown and slightly bitter. The twigs are greenish and minutely hairy when young, becoming gray or brown.

"The slender green petioles are $3/4$ -- 2 $3/4$ inches long, and the leaflet stalks $1/4$ inch or less in length. Leaflet blades are 2--6 inches long and 1 $1/4$ -- 3 inches wide, mostly short-pointed at both ends, thin or slightly thickened, above light green, beneath paler and hairy on the veins.

"Often the ground under a tree in flower has a bluish tinge from the numerous fallen corollas. Flower clusters (cymes) 2--6 inches long at base of leaves bear several to many slightly fragrant flowers on short slender stalks. The flower about $3/8$ inch

long has a cuplike calyx less than 1/8 inch high and broad; pale blue or purplish-blue irregular finely hairy corolla with narrow tube 1/4 inch long and 5 unequal, spreading, wavy-margined lobes, 1 much larger than the others; 4 stamens 1/4 inch long in 2 pairs inserted on corolla tube and slightly protruding; and pistil 3/8 inch long with 4-celled ovary and slender style 2-forked at end.

"The fruit (drupe) contains a large 4-celled and 4-seeded stone. In maturing, fruits change color from yellow green to brownish and black. Observed in flower from February to July and in fruit from June to November.

"The grayish sapwood turns light brown upon drying. The heartwood when freshly cut is tan to brown, generally variegated with darker shades, and afterwards becomes gray brown to deep brown, often with indistinct, narrow, lighter or darker bands. The wood is hard, heavy (specific gravity 0.62), strong, tough, and fine-textured and has irregular, interlocking grain and well-defined growth rings. Air-seasoning is too slow to be practicable commercially. Amount of degrade is minor. Machining characteristics are as follows: planing and resistance to screw splitting are poor; shaping, boring, and mortising are good; turning is excellent; and sanding is fair. The wood works easily and takes a fine polish. It is moderately resistant to dry-wood termites and is durable in contact with the ground.

"The wood is used for framework of houses, fenceposts, construction, cabinetwork, and elsewhere for shingles. It should be suitable also for sporting goods, tool handles, boats, and flooring.

"Planting tests show this species to grow slowly and to require nearly full sunlight. The trees, which become covered with flowers, are suitable for ornamentals also. They can be propagated from cuttings and grow rapidly in open areas. A honey plant.

"Widely distributed in coastal limestone, and lower mountain regions of Puerto Rico. Also in St. Croix, St. Thomas, St. John, and Tortola.....Range. -- Cuba, Hispaniola (Haiti), Puerto Rico and Virgin Islands, and throughout Lesser Antilles to Grenada and Trinidad and Tobago. Also in Venezuela and Guianas."

They recommend the common names "higüerillo" and "white fiddlewood", but say "Other common names. -- *pendula*, *pendula blanca* (Puerto Rico); *roble guayo*, *roble de olor*, *ofón criollo* (Cuba); *totumillo* (Venezuela); *fiddlewood* (St. Kitts, St. Vincent); *white fiddlewood* (Montserrat); *bois lézard* (Dominica); *black fiddlewood* (Trinidad); *timber fiddlewood* (Tobago); *bois lézard*, *bois à agouti* (Guadeloupe, Martinique)."

Additional citations: HISPANIOLA: Dominican Republic: R. A. Howard 12207 (Mi, N, S). PUERTO RICO: Alain 9439 (N), 9967 (G, Ij, N, N, S, Sj, W); Webster, Ellis, & Miller 8733 (Mi, S). LEEWARD ISLANDS: Antigua: Box 1006 (Mi). WINDWARD ISLANDS: Martinique: Stehle & Stehle 6024 (W—2453652). St. Lucia: Proctor 17797 (N). VENEZUELA: Aragua: Ll. Williams 11119 (W—1778874, W—2407802). Federal District: Vivas 54412 (Ve).

VITEX DIVARICATA var. CUBENSIS Urb.

Additional bibliography: Moldenke, *Phytologia* 8: 35. 1961; Jiménez, *Supl. Cat. Fl. Doming.* 1: 221--222. 1966.

Additional citations: CUBA: Havana: P. Wilson 1066 (W-1584487). Las Villas: C. F. Baker 3409 (W-1584493). Oriente: Ekman 6206 (Mi).

VITEX DIVERSIFOLIA Kurz

Additional bibliography: Moldenke, *Phytologia* 5: 321. 1955; Moldenke, *Résumé* 166 & 476. 1959.

VITEX DJUMAENSIS DeWild.

Additional bibliography: Moldenke, *Phytologia* 5: 321--322. 1955; Moldenke, *Résumé* 142 & 476. 1959.

VITEX DONIANA Sweet

Additional synonymy: *Vitex cienkovskii* Kotsch. & Peyr., in herb.

Additional & emended bibliography: Aschers. in G. Schweinf., *Beitr. Fl. Aethiop.* 278. 1867; K. Schum. in Just, *Bot. Jahresber.* 28 (1): 497 & 498. 1902; Volkens, *Notizbl. Bot. Gart. Berl.* 5, App. 22 (2): 34--35, fig. 12. 1909; J. H. Holland, *Kew Bull. Addit. Ser.* 9 [Useful Pl. Nigeria 3]: 525--526. 1915; Unwin, *W. Afr. Forest.* 398. 1920; F. R. Irvine, *Pl. Gold Coast* xlii, lxvi, & 436--437. 1930; Hutchinson & Dalz., *Fl. W. Trop. Afr.*, ed. 1, 2: 277. 1931; Dalz., *Useful Pl. W. Trop. Afr.* 456--457. 1937; Aubrév., *Fl. Forest. Soudano-Guin.* 504, pl. 113, 1 & 2. 1950; Berhaut, *Fl. Sénégal* 21. 1954; Moldenke in Humbert, *Fl. Madag.* 174: 72, 93--96, & 272, fig. 13, 1. 1956; Aubrév., *Fl. For. Cot. Iv.*, ed. 2, 3: 230, pl. 335, fig. 1 & 2. 1959; F. R. Irvine, *Woody Pl. Ghana* 761. 1961; Moldenke, *Phytologia* 8: 63. 1961; Jaeger & Winkoun, *Bull. Inst. Franç. Afr. Noir* 24 [ser. A, no. 1]: 81. 1962; Cuf., *Senck. Biol.* 43: 283. 1962; Cuf., *Bull. Jard. Bot. Brux.* 32: Suppl. 797. 1962; Espirito Santo, *Junt. Invest. Ultramar Est. Ens. & Docum.* 104: 21, 27, 31, 33, 40, 46, 48, 51, 64, & 118. 1963; Huber in Hutchinson & Dalz., *Fl. W. Trop. Afr.*, ed. 2, 2: 445--447, fig. 308. 1963; H. P. Riley, *Fam. Flow. Pl. S. Afr.* 129. 1963; Lawton, *Kirkia* 3: 58, 72, & 73. 1963; F. White, *Webbia* 19: 680. 1965; Moldenke, *Résumé Suppl.* 12: 13. 1965; Nielsen, *Introd. Flow. Pl. W. Afr.* 73, 75, 80, 82, 85, & 162--164, fig. 43b. 1965.

Additional illustrations: Volkens, *Notizbl. Bot. Gart. Berl.* 5, App. 22 (2): 35, fig. 12. 1909; Aubrév., *Fl. Forest. Soudano-Guin.* pl. 113, 1 & 2. 1950; Moldenke in Humbert, *Fl. Madag.* 174: 95, fig. 13, 1. 1956; Aubrév., *Fl. For. Cot. Iv.*, ed. 2, 3: pl. 335, fig. 1 & 2. 1959; Huber in Hutchinson & Dalz., *Fl. W. Trop. Afr.*, ed. 2, fig. 308. 1963; Nielsen, *Introd. Flow. Pl. W. Afr.* fig. 43b. 1965.

Recent collectors and authors describe this plant as a small or medium-sized tree, 8--60 feet tall, with a girth of up to 4 feet, much-branched, completely deciduous; bole straight; crown hemispheric; bark scaly, light-gray, longitudinally fissured,

peeling easily; young stems yellowish; branchlets glabrous or pubescent; leaves hard, leathery, digitate; petioles blackish, with a distinct bow or curve from the horizontal plane; leaflets 5, the two basal ones small, stalked, obovate, about 6 inches long and 3 inches wide, rounded at the apex, cuneate at the base, dark- or rather light-green above, paler beneath, with 10 pairs of secondaries; flowers small, fragrant, borne in stout, brown-hairy, axillary, densely-flowered cymes, 1 or 2 opening at a time, white or yellowish with blue-purple centers; fruits subglobose, 3/4 inch long, large, black, edible, glabrous.

The fruits are galled on Carrisso & Mendonca 157. The corollas are described as "blue" on Barbosa 2155, "violet" on Gomes e Sousa 4395 and Torre 3688 & 5196, "purple" on Faulkner 1163, "mauve" on Tanner 1758, "dull creamy-white and purple lips" on Faulkner 2441, "white, lower lip violet" on Mendonca 2304, "white, spotted with lilac" on Barbosa 1763, "brown-hairy outside, upper lobes white inside, lower lip blue, yellow in throat" on Harley 9467, "lower lip violet with yellow spot" on Mendonca 1343, and "lívida, com os lábios internamente róseos" on Mendonca 654.

The species has been found growing in wet or gallery forests, coastal bush, wet ground or wet sandy soil, open forests of Brachystegia spp. and Julbernardia globiflora, deciduous forests of Brachystegia and Isoberlinia, almost in the water on riverbanks, and on shrubby savannas with Hyphaene sp., Kigelia pinna-ta, Combretum spp., and Sclerocarya caffra, at altitudes of from sealevel to 3000 feet, flowering from January to April and August to October, and fruiting from February to April and June to August. Harley refers to it as "frequent in forest along margin of rocky river" in Tanganyika. Huber (1963) says "Widespread in tropical Africa extending to the Comoro Islands" and dates the original publication by Sweet as "1827". The larger leaflets on Simão 251 are repand-crenate toward the apex. F. A. Mendonca 3890 is said to match well Buchanan 194 & 340, Dandy 661, Dümmer 2779, Schlieben 6456, and Swynnerton 1056, 1058, & 2037 in the herbarium of the British Museum.

Additional vernacular names recorded for this species are "abis(wa)", "afua", "bessápale", "black fō", "búmè", "burzun dinya", "cetona", "cutubulô", "cutúbulô", "dyolo", "ěbissaa", "edin", "fɔyitɛ o" [black V. grandifolia tree], "fɔyitɛ o", "fɔyiti", "fɔyiti", "fɔti", "fəti", "gua", "gúa", "hubvo", "kw'allon 'dinya", "mansopane", "m'cubvo", "mecuvo", "m'fuvo", "molha", "monsopane", "m'pindimbi", "m'purro", "mucubvo", "mucurro", "mucuvo", "muhuro", "múni", "munsopane", "munuro", "nailu", "n'bumbo", "nhanhahuro", "nyalbihi", "Ōrì of the open country", "puryutɛ o", "saman bir", "sɔ", "soɔ", "sodtɛ o", "sɔtɛ o", "tshikamba-tshitoma", "tshilongulongu tshá mushitu", "ubumbo", "um-dugulgun", "uōli", and "Eji". The names "búmè" and "cetona" are, however, also applied to V. madiensis Oliv.

Dalziel (1937) gives an excellent summary of the uses made of

this plant: "Often planted or retained in villages for the fruit and for the young leafy shoots, which can be used as a pot-herb. The ripe fruits resemble black plums. A Fulani proverb says 'the galbije of the blind man do not ripen'. They are sweet and edible; a kind of black molasses (Hausa ma'di) is made from them, generally mixed with that of other fruits (Detarium, Diospyros, etc.) by extracting the pounded pulp in a basket by repeated pouring of water and then concentrating by boiling, or candied to form alewa (see Cordia abyssinica). In Sierra Leone they are regarded as a good remedy for conditions due to A and B avitaminosis, associated with sores at the mouth and eyes, and sometimes paralytic symptoms in advanced cases. A beverage can be made from them (as from those of V. grandifolia). In E. Sudan the fruits are roasted and said to be a substitute for tea (Broun & Massey).

"Ink is made by boiling the black fruit and young leaves, dried in the sun or over a fire, to make a thick extract with gum which has been boiled separately; some make it from the bark. In N. Nigeria the bark is used mixed with the fragrant resin of Boswellia in one method of making ink. The bark is said to yield a dye used for cloth in Western Ashanti (Irvine).

"The young fresh leaves, mixed with groundnuts, salt, pepper, etc., form a food sold under the name of dinkin 'dinya' (see also under Celtis integrifolia). The fruit, and in some cases the bark and leaves, are given for diarrhoea and dysentery. In French Guinea an infusion of the leaves is given for colds, and a decoction of the pounded roots for stomach troubles (Pobéguin, Pl. Méd. Guin. 65). In N. Nigeria Loranthus growing on this tree is a remedy for leprosy (see also under Sapium Grahamii).

"The flowers and ripe fruits attract bees, and the hives are commonly put in the branches. In Gold Coast, N. Terr., it is being planted as a fodder tree.

"The wood is whitish to light brown, turning darker, of medium weight, easily worked, not polishing. It has some resemblance to teak, and is suitable for furniture, etc. It is used locally for boat timbers, ribs, etc., small canoes, house-building, drums, etc."

Irvine (1961) reports that in Ghana a sweetmeat is made from these and other fruits and that the "Bark and roots used to prepare a cloth dye (for Adink(a)ra cloths) are cut up" and "boiled with iron slag as mordant". He tells us that the wood is used for firewood and that the tree is found "in grass savannas, deciduous and secondary forests, thrives on very dry and gravelly soil", the very sweet edible fruit being sold in native markets (elephants are very fond of them); the bark used for stomach complaints. Nielsen (1965) says that this is the commonest species of the genus in western Africa, common on savannas and in open places, especially farmlands near villages, the young leafy shoots being used as a potherb. "This species and oil palm found on farmlands and savanna regrowth; planted and preserved trees are a

conspicuous feature; in open woodland savannas; in undisturbed areas of transition belt between woodland savanna and fringing forest strip; in riparian woodlands; planted for their fruits or preserved in brush clearing." Riley (1963) reports that it is used in the treatment of anemia and gonorrhea.

The Barbosa 1938 & 2092, distributed as the typical form of this species, are actually var. parvifolia (Engl.) Moldenke.

Irvine (1961) cites the following specimens from Ghana: Beveridge 2928; Brown 2321; Chipp 463, 727, & 744; Irvine 151, 194, 1810, & 1961; Kitson 690, 692, 888, & 946; Moore 2340; Saunders 3; and Vigne 1810 & 3541. Huber (1963) cites the following: DAHOMEY: Poisson s.n. MALI: Chevalier 164 bis, 2766, & 2769; Davey 500/102; Jaeger 17. SENEGAL: Chevalier 2757 & 2758; Heudelot 379. PORTUGUESE GUINEA: Espirito Santo 1735. GUINEA: Caille s.n. [Chevalier 14799], Chevalier 12866; Pobéguin 682; Scott Elliot 5211. SIERRA LEONE: Deighton 2841 & 3052; Lane-Poole 1; Miszewski 33; Thomas 2824. IVORY COAST: Aubréville 428 bis, 806, & 1244. GHANA: Ankrah GC.20347; Chipp 463, 727, & 744; Irvine 194; Saunders 3. TOGOLAND: Warnecke 156. NIGERIA: Northern: Barter 1108; Jones FHI.675; Lafia FHI.7758; Lely P.134; Yates 59. Southern: Brenan 8956; Chesters 190; Hepper 2225; Millen 118; A. F. Ross R.71. CAMEROONS: Daramola FHI.40485; Hepper 1921; Latilo & Daramola FHI.28927 & FHI.34485; McClintock 175.

Additional citations: TANGANYIKA: H. G. Faulkner 1163 (B), 1202 (B); R. M. Harley 9467 (S); Tanner 1758 (B). ZANZIBAR: H. G. Faulkner 2441 (S). ANGOLA: Lunda: Barros Machado s.n. [Ang. Veg. 173] (U1); Carrisso & Mendonca 157 (U1); Fontinha 14265 (U1). PORTUGUESE EAST AFRICA: Cabo Delgado: Andrada 1352 (U1); Barbosa 2155 (U1), 2277 (U1); M. F. Correia 229 (U1); F. A. Mendonca 1033 (U1); Torre & Paiva 9713 (U1). Manica e Sofala: Andrada 1204 (U1); Barbosa 845 (U1), 955 (U1), 1578 (U1); Garcia 46 (U1), 60 (U1), 129a (U1), 432 (U1); B. Goldsmith 128/62 (U1); F. A. Mendonca 3890 (U1), 4394 (U1); Simão 251 (U1), 563 (U1); Torre 3030 (U1), 4039 (U1); Torre & Paiva 9106 (U1). Mozambique: Barbosa 1763 (U1); Gomes e Sousa 849 (U1), 4395 (U1). Niassa: Gomes e Sousa 4079 (U1), 4113 (U1), 4136 (U1); F. A. Mendonca 654 (U1), 783 (U1). Tete: Andrada 1742 (U1); F. A. Mendonca 501 (U1); Torre 3688 (U1), 4569 (U1). Zambezia: F. A. Mendonca 1343 (U1), 2304 (U1, U1); Torre 3470 (U1), 3662 (U1), 4439 (U1), 4808 (U1), 4923 (U1), 5196 (U1).

VITEX DONIANA var. PARVIFOLIA (Engl.) Moldenke

Additional bibliography: Moldenke, Phytologia 8: 36. 1961.

Recent collectors describe this plant as a tree, 10 m. tall, growing on termitaria, at altitudes of 65 to 1330 m., flowering in August and September, and called "lómue", "m'purro", "muhuro",

and "nhanhahuro".

Additional citations: UGANDA: Dummer 2779 (W—1172991); Mearns 2564 (W—632527). PORTUGUESE EAST AFRICA: Cabo Delgado: Barbosa 1938 (U1), 2092 (U1). Tete: Andrada 1767 (U1). Zambezia: Andrada 1914a (U1). Province undetermined: Andrada 1324 (U1).

VITEX DRYADUM S. Moore

Additional bibliography: Moldenke, Phytologia 5: 327. 1955; Moldenke, Résumé 151 & 476. 1959.

VITEX DUBOISII Moldenke

Bibliography: Moldenke, Phytologia 4: 60--61 (1952) and 5: 327--328. 1955; Moldenke, Résumé 142 & 476. 1959.

VITEX DUCKEI Huber

Additional & emended bibliography: Le Cointe, Amaz. Bras. III Arv. & Plant. Uteis, ed. 1, 429 (1934) and ed. 2, 455--456. 1947; Moldenke, Phytologia 8: 36. 1961.

Le Cointe (1947) states that this tree is found on terra firme "nas campinas de areia con humus" and records the vernacular name "tarumá do campo".

A specimen of Ducke 106 deposited in the herbarium of the Botanisches Museum at Berlin was photographed there by Macbride as his type photograph number 17560 (although it is not one of the cotypes on which the name is based), but is now destroyed.

Additional citations: BRAZIL: Amazonas: Ducke 106 [Macbride photos 17560] (W—1693111, W--photo).

VITEX DUCLOUXII Dop

Additional bibliography: Moldenke, Phytologia 5: 330. 1955; Moldenke, Résumé 171 & 476. 1959.

VITEX EBERHARDTII Dop

Additional bibliography: Moldenke, Phytologia 5: 330--331. 1955; Moldenke, Résumé 177 & 476. 1959.

VITEX ELAKELAKENSIS Moldenke

Bibliography: Moldenke, Phytologia 3: 434--435 (1951) and 5: 331--332. 1955; Moldenke in Humbert, Fl. Madag. 174: 76, 124--126, & 272, fig. 19, 1--3. 1956; Moldenke, Résumé 157 & 476. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 125, fig. 19, 1--3. 1956.

VITEX EPIDICTYODES Mildbr.

Synonymy: Vitex epidictyoides Mildbr. ex Moldenke, Phytologia 8: 36, sphalm. 1961.

Additional bibliography: Moldenke, Phytologia 8: 36. 1961.

VITEX FARAFANGANENSIS Moldenke

Bibliography: Moldenke, Phytologia 3: 435--436 (1951) and 5:

334. 1955; Moldenke in Humbert, Fl. Madag. 174: 74, 105—107, & 272, fig. 15, 5—7. 1956; Moldenke, Résumé 157 & 476. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: 105, fig. 15, 5—7. 1956.

VITEX FERRUGINEA Schum. & Thonn.

Additional & emended synonymy: Vitex ferruginea Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902. Vitex fosteri C. H. Wright, Kew Bull. Misc. Inf. 1908: 437. 1908.

Additional & emended bibliography: K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; C. H. Wright, Kew Bull. Misc. Inf. 1908: 437. 1908; J. H. Holland, Kew Bull. Addit. Ser. 9 [Useful Pl. Nigeria 3]: 526. 1915; Unwin, W. Afr. Forest. 399. 1920; Pieper in Engl., Bot. Jahrb. 62, Beibl. 141 ["142"]: 50, 68, 70, & 81, pl. 10. 1928; F. R. Irvine, Pl. Gold Coast 437. 1930; Hutchinson & Dalz., Fl. W. Trop. Afr., ed. 1, 2: 276. 1931; Dalz., Useful Pl. W. Trop. Afr. 457. 1937; Worsdell, Ind. Lond. Suppl. 2: 500. 1941; H. N. & A. L. Moldenke, Fl. Life 2: 60. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 111—113, 119, & 201. 1949; Moldenke in Humbert, Fl. Madag. 174: 104 & 272. 1956; Moldenke, Résumé 136, 137, 142, 147, 383, & 476. 1959; Aubrév., Fl. For. Cot. Iv., ed. 2, 3: 233, pl. 337a. 1959; Moldenke, Phytologia 8: 63. 1961; Huber in Hutchinson & Dalz., Fl. W. Trop. Afr., ed. 2, 2: 446 & 447. 1963; Moldenke, Phytologia 15: 99. 1967.

Illustrations: Pieper in Engl., Bot. Jahrb. 62, Beibl. 141 ["142"]: pl. 10. 1928; Aubrév., Fl. For. Cot. Iv., ed. 2, 3: pl. 337a. 1959.

Schumann (1902) regards V. congolensis DeWild. & Th. Dur. as a synonym of V. ferruginea; certainly they are very closely related. Vitex fosteri was maintained as a valid species by me in my previous publications, but is reduced to synonymy here on the authority of Huber (1963).

Irvine (1930) describes the bark of V. ferruginea as thin and stringy and the fruit "like a small plum", and records the vernacular name "Əwent Ərowa" [meaning "antelope's garden egg"]. Huber (1963) describes the plant as a "Tree 15—50 feet high with ochre indumentum on inflorescences and young parts; flowers pink to purple, sometimes almost cauliflorous; in closed forest....Also in Congo". He cites the following specimens: PORTUGUESE GUINEA: Espirito Santo 1948 & 2059. GUINEA: Baldwin 9678. SIERRA LEONE: Deighton 3077, 3128, 3520, 3534, & 6085. LIBERIA: Baldwin 9430. IVORY COAST: Aubréville 154, 421, & 938. GHANA: Hall 1509; Thompson 37; Vigne FH.1761, FH.1876, & FH.1893. NIGERIA: Southern: Ainslie 129 & 139; Dalziel 1246; Foster 34; Unwin 9; C. H. Wright R.135.

The species has been collected in anthesis from March to May and in August, and in fruit in June, July, September, and October. Dalziel (1937) says "The wood is white, soft, used for house-posts,

etc.; durable for interior work, and also for verandah posts, door and window-frames, etc."

Additional citations: GUINEA: Thonning 265 (Cp, N--photo, Z--photo). UGANDA: Dummer 757 (W--634598).

VITEX FISCHERI Gürke

Additional bibliography: Shantz & Turner, Photog. Decum. Veg. Changes 156 & 158, fig. 46a & 51b. 1958; Moldenke, Phytologia 8: 37. 1961; Lawton, Kirkia 3: 74. 1963.

Illustrations: Shantz & Turner, Photog. Docum. Veg. Changes fig. 46a & 51b. 1958.

Lucas describes this plant as a tree, about 40 feet tall, the "flowers pale-lilac all over except for the lower lip which is darker and almost purple", growing at forest edges, at 5300 feet altitude, flowering in June. Shantz & Turner (1958) cite their no. 4235 from "Belgian Congo and Ruanda-Urundi", although the labels accompanying this collection indicate that it was gathered in Tanganyika! They also record the species from Uganda, but I have seen no material as yet from either the Congo or Uganda.

Additional citations: KENYA: G. L. Lucas 131 (S, Z).

VITEX FLAVA Ridl.

Additional & emended bibliography: H. N. Ridl., Kew Bull. Misc. Inf. 1929: 261--262. 1929; Anon., Kew Bull. Gen. Index 1929-1956, 293. 1959; Moldenke, Phytologia 8: 37. 1961.

VITEX FLAVENS H.B.K.

Additional & emended bibliography: Bocq., Adansonia 3: [Rev. Verbenac.] 253. 1863; Le Cointe, Amaz. Bras. III Arv. & Plant. Uteis, ed. 1, 429 (1934) and ed. 2, 456. 1947; Moldenke, Phytologia 5: 336 (1955) and 5: 359--361. 1956; Moldenke, Biol. Abstr. 30: 3551. 1956; Moldenke, Résumé 49, 69, 81, 85, 111, 383, 388, & 476. 1959.

Recent collectors describe this plant as a small tree, 5 m. tall, with a trunk diameter of 15 cm. at breast height, the bark gray, with many deep longitudinal furrows, the wood "resistente, para segeria, moirões, esteios, dormentes -- Cor parda escura", with a density of 0.65, called "mameira" or "tarumá taira", inhabiting dry upland scrub forests, as well as campos or terra firma, at 1400 feet altitude. Le Cointe (1947) records it from Marajó Island.

The type, Humboldt & Bonpland s.n., deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris, was photographed there by Macbride as his type photograph number 39494.

Material has been misidentified and distributed in herbaria as Tabebuia sp. On the other hand, the Ducke 2488, distributed as V. flavens, is actually V. panshiniana Moldenke.

Additional citations: COLOMBIA: Huila: E. L. Little 9137 (W--2140885). PERU: Province undetermined: Humboldt & Bonpland s.n. [Herb. Willdenow 11710; Macbride photos 39494] (W--photo of type).

VITEX FLORIBUNDA Legris

Bibliography: Legris, Trav. Sect. Scient. Inst. Franç. Pond. 6: 520 & 586. 1963.

I know nothing of this taxon other than that it is referred to in the reference given above.

VITEX FLORIDULA Duchass. & Walp.

Additional bibliography: Moldenke, Phytologia 8: 37. 1961.
The corollas are described as "light-violet" on P. H. Allen 259.

Additional citations: PANAMA: Panamá: P. H. Allen 259 (Du--358187).

VITEX FROESII Moldenke

Additional bibliography: Moldenke, Phytologia 5: 363. 1956;
Moldenke, Résumé 111 & 476. 1959.

VITEX GABUNENSIS Gürke

Additional bibliography: Moldenke, Phytologia 5: 363--364. 1955; Moldenke, Résumé 140 & 476. 1959.

VITEX GAMOSEPALA Griff.

Additional & emended bibliography: Fletcher, Kew Bull. Misc. Inf. 1938: 432 & 436--437. 1938; Anon., Kew Bull. Gen. Index 1929-1956, 293. 1959; Moldenke, Phytologia 8: 63. 1961.

The H. H. Bartlett 6919, Boeea 7155, 7184, 7245, 7532, 7821, 7971, & 8126, and Yates 2036, distributed as typical V. gamosepala, are actually all var. kunstleri King & Gamble.

VITEX GAMOSEPALA var. KUNSTLERI King & Gamble

Additional bibliography: Moldenke, Phytologia 8: 38. 1961.
Boeea refers to this plant as a tree, growing in old jungles, at 2500 feet altitude, known locally as "kajoe giak batoe", "kajoe hae aek", or "kajoe homos". The corolla is said to have been yellow on H. H. Bartlett 6919; a wood sample accompanies this collection as well as Boeea 7532. Material has been misidentified and distributed in herbaria as typical V. gamosepala Griff. and as V. vestita Wall.

Additional citations: INDONESIA: GREATER SUNDA ISLANDS: Sumatra: H. H. Bartlett 6919 (Mi); Boeea 7155 (Mi), 7184 (Mi, Mi, Mi), 7245 (Mi), 7532 (Mi, Mi), 7821 (Mi), 7971 (Mi), 8126 (Mi, Mi), 8501 (Mi, Mi); Yates 2036 (Mi).

VITEX GAMOSEPALA var. SCORTECHINII King & Gamble

Additional bibliography: Moldenke, Résumé 181, 188, & 476. 1959; Moldenke, Phytologia 8: 63. 1961.

VITEX GARDNERIANA Schau.

Additional bibliography: Sampaio, Bol. Mus. Nac. Rio Jan. 13: 234. 1937; Moldenke, Phytologia 8: 38. 1961.

A cotype, G. Gardner 1107, deposited in the herbarium of the

Conservatoire et Jardin Botaniques at Geneva, was photographed there by Macbride as his type photograph number 28400.

Additional citations: BRAZIL: Ceará: Cutler 8263 (W--1989699). Pernambuco: G. Gardner 1107 [Macbride photos 28400] (W--photo of cotype).

VITEX GAUMERI Greenm.

Additional & emended bibliography: P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1235 & 1236. 1924; C. L. Lundell, Contrib. Univ. Mich. Herb. 8: 61. 1942; Moldenke, Phytologia 8: 63. 1961; Menninger, Flow. Trees World 18--19 & 284. 1962; Shelford, Ecol. N. Am. 409 & 607. 1963; Gómez Pompa, Bol. Soc. Bot. Mex. 29: 94. 1965.

Additional synonymy: Vitex guameri Greenm., in herb.

Recent collectors describe this plant as a tree or large tree, 50 feet tall, the trunk thick, 40 inches in diameter, often with cavities at the base, the bark brown and ridged, growing in moist ground near the edge of forests, known as "crucillo", "Mexican vitex", or "yáaxnik". Hunt refers to it as "common in hardwood forests on limestone". The corollas are described as "blue" on Gentle 4646, "deep-blue" on D. R. Hunt 474, and "purple" on Chute M.110. Material has been misidentified and distributed in herbaria as V. pyramidata B. L. Robinson.

Additional citations: MEXICO: Campeche: Marroquín 1148 (Ip, Ws). Chiapas: Gómez Pompa 318 (W--2448148). Guerrero: Chute M.110 (Mi). Yucatán: Collector undetermined 4 [wood no. 11080] (Ws); G. F. Gaumer 607 [Herb. Field Mus. 15599] (Ws--isotype); Lundell & Lundell 7321 (Du--362989, Rf). GUATEMALA: Alta Verapaz: J. A. Steyermark 45782 (Rf). El Petén: Contreras 855 (Ld, S), 2336 (Ld, S), 2526 (Ld, S); C. L. Lundell 15887 (Ld), 15983 (Ld, S), 16079 (Ld, Mi), 17112 (Ld). BRITISH HONDURAS: Gentle 4646 (Mi, Rf, Rf), 9083 (Ld); D. R. Hunt 474 (W--2398888).

VITEX GEMINATA H. H. W. Pearson

Additional bibliography: Moldenke, Phytologia 5: 373. 1956; Moldenke, Résumé 154 & 476. 1959.

VITEX GIGANTEA H.B.K.

Synonymy: Vitex gigantea Humb. & Kunth ex Benth., Bot. Voy. Sulphur 154. 1846.

Additional bibliography: Benth., Bot. Voy. Sulphur 154--155. 1846; Bocq., Adansonia 3: [Rev. Verbenac.] 253. 1863; Moldenke, Phytologia 5: 373. 1956; Moldenke, Résumé 81, 85, 225, & 476. 1959; Soukup, Biota 5: 137. 1964.

Additional citations: ECUADOR: El Oro: E. L. Little 6634 [U. S. Dept. Agr. Forest Serv. 95915] (W--1876237). Guayas: Dodson & Thien 1290 (Z). Los Ríos: Myer & Little 6504 [U. S. Dept. Agr. Forest Serv. 95914] (W--1876221).

VITEX GIORGII DeWild.

Additional bibliography: Moldenke, Phytologia 5: 355 & 375--

376. 1956.

VITEX GLABRATA R. Br.

Additional synonymy: Pitex heterophylla Roxb. ex Moldenke, Résumé Suppl. 3: 34, in syn. 1962.

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BOOK REVIEW

Alma L. Moldenke

"The Galápagos" - Proceedings of the Symposia of the Galápagos International Scientific Project of 1964 - edited by Robert I. Bowman, xvii & 318 pp., illus., University of California Press of Berkeley & of Los Angeles, California, and Cambridge University Press of London, England. 1966. \$10.00

With the expressed unifying theme of evolution, with the original intention of collecting and collating background information for the fortunate participants in this undertaking, and now with the presenting of this scientific knowledge of these fascinating islands to many biologically, geologically and generally interested readers, the editor and the authors have produced forty valuable, well documented papers, a fine introduction and a useful 4-column index (even though it missed Cornutia which appears twice on p. 188 albeit as misidentifications and with the binomials incorrectly accredited).

Everything about this book is outstanding from the fine quality of the paper, print and color photography, the reasonable price, to the excellence of the authors in their specializations and writings. It opens impressively with Sir Julian Huxley's "Charles Darwin: Galápagos and After". Papers of predominantly botanical interest deal with

- variation and adaptation by Stebbins
- origins and relationships of the flora by Wiggins
- botany of Cocos Island by Fournier
- plant lists from Cocos Island by Fosberg and Klawe
- lichenology and bryology with check lists by Weber
- origin and dispersal of native cottons by Stevens and Rick
- cacti and their relations with tortoises by Dawson
- plant-animal relations by Rick
- pollinating insects by Linsley
- oceanic volcanic island ecosystems by Fosberg
- conservation by Acosta-Solis

Besides imparting valuable information, reading this book creates the same effect as does a most alluring travel folder.



Moldenke, Harold N. 1967. "Additional notes on the genus *Vitex*. III." *Phytologia* 15, 73–113. <https://doi.org/10.5962/bhl.part.21067>.

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