

STUDIES IN THE BORAGINACEAE, XVII

IVAN M. JOHNSTON

A. CORDIA SECTION VARRONIA IN MEXICO AND
CENTRAL AMERICA

WHILE PREPARING AN ACCOUNT of the Boraginaceae for the southern West Indies it became necessary to typify the *Cordias* proposed by Linnaeus and also to re-examine the definition of certain widely ranging species. The results of these investigations came to involve a goodly proportion of the *Varronias* growing in Mexico and Central America. Since a discussion of them would be out of place in a paper dealing with the Antillean flora, they have been brought together and, with other observations, presented as a preliminary synopsis of the group for the region mentioned. Some of the species, e.g., *Cordia oaxacana*, *C. Pringlei*, *C. coyucana*, *C. curassavica*, and *C. spinescens*, have been treated cursorily and conservatively. They need much further study.

A few words are needed regarding the history, definition, and typification of *Varronia*. The name was coined and first used by Browne, Hist. Jam. 172 (1756), in describing Jamaican plants later called *C. globosa* and *C. curassavica*. Linnaeus was the first to use it in a strictly binomial classification, Syst. ed. 10, 916 (1759). He referred two species to it, *Varronia lineata* L. and *V. bullata* L. These two, both treated in the present paper, obviously belong to *Varronia* as usually defined. The group is, however, only a well-marked section of *Cordia*. It is confined to America and is best distinguished by fruiting structures. The fruit is usually matured in a cup-shaped calyx and is drupaceous. When ripe it has a conspicuous, thin, fleshy, usually cherry-red mesocarp which shrinks and fades and seems to disappear when the fruit is dried. The bony endocarp at maturity is usually single-seeded, irregularly ellipsoidal, and generally coarsely and irregularly tuberculate. The corolla in most *Varronias* has lobes much broader than long. The inflorescence is an open cyme in some species, but in most is either a dense head or a spike that matures its terminal flower first. In habit the plants are shrubs, woody scrambling climbers, or small trees. Many of them produce tiny aromatic granules on the herbage that give them a characteristic sagy odor. *Cordia parvifolia* DC. (*C. Greggii* Torr.; *C. Watsonii* Rose), although placed in *Varronia* by some authors, is accordingly here excluded. Among Mexican species *C. parvifolia* is actually most closely related to *C. elaeagnoides* DC. Note should be made of the treatment of *Varronia* by Friesen, Bull. Soc. Bot. Genève sér. 2, 24: 115–201 (1933). That author not only treats *Varronia* as a genus, but has even broken it up into a number of segregate

genera. Personally I am entirely unable to find any justification for treating the Mexican and Central American species under four distinct genera, *Varronia*, *Montjolya*, *Ulmarronia*, and *Cordiopsis*, as Friesen proposes.

KEY TO SPECIES

Corolla large, 1–3 cm. long, pure white, salverform or funnelliform.

Calyx clothed with abundant spreading hairs; tip of lobes conspicuously prolonged, filiform, 2–5 mm. long.....1. *C. oaxacana*.

Calyx clothed with straight appressed hairs, tip of lobes weakly or not at all prolonged (less than 2 mm. long).

Corolla 2–3 cm. long, with a slender elongate tube much exerted from the calyx; leaves ovate to elliptic, 2–3 times as long as broad; calyx-lobes prolonged into free tips 1–2 mm. long.....2. *C. limicola*.

Corolla 1–2 cm. long, its proper tube short and barely exerted from the calyx; leaves lanceolate, 3–5 times as long as broad; calyx-lobes with tips scarcely prolonged.....3. *C. podocephala*.

Corolla much smaller.

Foliage clothed with stellate hairs.

Calyx-lobes with well-developed very elongate linear tips 2–5 mm. in length; heads in bud 2–3 cm. in diameter.....4. *C. Pringlei*.

Calyx-lobes with inconspicuous or scarcely if at all developed free tips; heads in bud 10–18 mm. in diameter.....5. *C. stellata*.

Foliage bearing simple hairs only.

Flowers borne in a forking cyme.

Leaves firm, usually broadest at or above middle, the upper surface distinctly scabrous from an abundance of short stiff appressed hairs; calyx-lobes abruptly short-acuminate, their apices free and forming a short but distinct tip on the unopened calyx.....6. *C. foliosa*.

Leaves not very firm, usually broadest at or below middle, the upper surface bearing only widely scattered strongly appressed hairs; calyx-lobes acute; unopened calyx with unappendaged apex.....7. *C. bifurcata*.

Flowers borne in heads or spikes.

Flower-clusters capitate.

Peduncles mostly axillary.....8. *C. lineata*.

Peduncles never axillary, but terminal or internodal.

Calyx-lobes with apex acute or with prolonged tips only 1 mm. long or less.

Heads ellipsoidal, somewhat longer than broad, 10–15 mm. thick; mature fruit enclosed by a loose papery accrescent calyx and eventually freed by the break-up of the latter.....9. *C. coyucana*.

Heads globose, not longer than broad, mostly 10 mm. or less thick.

Calyx at anthesis 4–6 mm. long, glabrous or with only scattered relatively coarse appressed hairs; calyx-lobes distinctly attenuate, the tips 0.5–1 mm. long, free and usually spreading in the bud; corolla flaring, about 5 mm. long; leaves lance-ovate, ovate, or elliptic, 2–6 cm. broad, upper surface with branches of veins usually evident.....10. *C. ambigua*.

Calyx at anthesis 1.5–3 mm. long, clothed with abundant minute usually appressed hairs, lobes deltoid, the acute apices not free in the bud; corolla tubular, 2.5–4 mm. long; leaves usually lanceolate or ob-

lanceolate and 1–2 cm. broad but occasionally becoming lance-ovate to elliptic and up to 5 cm. broad, upper surface with branches of veins rarely if at all evident.....11. *C. inermis*.

Calyx-lobes with prolonged free linear tips 2–4 mm. long.

Leaves firm, thickish, with sharp teeth and a sharply acute apex, lower surface with a prominent reticulum of repeatedly branched and anastomosing veins, and with one or more small, well-defined concave or obconic depressions in many of the vein-areoles; upper leaf-surface usually verrucose, with short stiff ascending or nearly erect hairs arising from bulbous bases; peduncles usually elongating, usually over 2 cm. long; corolla 4–6 mm. long, usually hardly surpassing the calyx, the tube expanding into a subcampanulate throat...12. *C. bullata*.

Leaves thinner, usually with rounded teeth and obtusish at the tip, lower surface with simple veins or these sparsely and inconspicuously branched and anastomosing, rarely developing any small concave depressions; upper leaf-surface more or less strigose, the hairs arising from unthickened or from flat or merely convex pustulate bases; peduncles usually less than 2 cm. long; corolla 5–9 mm. long, usually surpassing the calyx, funnellform, the tube expanded into a broadly obconic throat.....13. *C. globosa*.

Flower-clusters elongating, spikes.

Base of petiole not decurrent on the subtended axillary shoot, at most only the basal 1–2 mm. hardening and persisting on defoliated branches; plant an erect shrub bearing no axillary inflorescences; spikes borne singly, either terminal or springing from naked internodes along leafy stems.....14. *C. curassavica*.

Base of petiole decurrent for 5–10 mm. on the subtended axillary shoot or peduncle, usually persisting as a conspicuous indurate decurved spur on defoliated branches; plant a scrambling shrub, producing most of its spikes (singly or in panicles) from the axils along leafy stems, only those first produced by the stem being terminal.

Calyx-lobes with short free tips forming a short but distinct apical prolongation on the unopened calyx; spikes borne in terminal and axillary panicles.....15. *C. costaricensis*.

Calyx-lobes without free tips, the unopened calyx with a rounded unappendaged apex; spikes rarely paniculate, most of them springing singly from the leaf-axils along the stems.....16. *C. spinescens*.

1. *Cordia oaxacana* DC. Prodr. 9: 497 (1845).—near Tololapa, Oaxaca, *Andrieux* 203.

Varronia oaxacana (DC.) Friesen, Bull. Soc. Bot. Genève sér. 2, 24: 175 (1933).

Cordia appendiculata Greenm. Field Mus. Pub. Bot. 2: 338 (1912).—Cañon de Tomellin, Oaxaca, *Conzatti* 2218.

Varronia oaxacana var. *appendiculata* (Greenm.) Friesen, Bull. Soc. Bot. Genève sér. 2, 24: 176, t. 1, f. 8 (1933).

Cordia perlonga Fernald, Proc. Am. Acad. 33: 90 (1897).—Acapulco, *Palmer* 70.

Cordia urticacea Standley, Contr. U. S. Nat. Herb. 23: 1222 (1924).—Real de Guadalupe, Guerrero, *Langlassé* 355.

Varronia urticacea (Standl.) Friesen, Bull. Soc. Bot. Genève sér. 2, 24: 174 (1933).

MEXICO: Aguas Calientes, 1837, *Hartweg* 181 (G); Zacuapan, Vera Cruz, *Purpus* 8477 (G, US); Lake Chapala, Jalisco, *Hitchcock & Stanford* 7174 (G, US); Zitacuaro to Coyota, Michoacan, tree 3 m., *Hinton* 13153 (G, US); Acapulco, Guerrero, 1895, *Palmer* 70 (G, TYPE of *C. perlonga*; US); San Antonio, Guerrero, shrub 1.5–2 m., *Hinton* 10256 (G, US) and 10542 (G, US); Real de Guadalupe, Guerrero, shrub 2 m., *Langlassé* 355 (US, TYPE); Picacho to San Geronimo, Oaxaca, *Purpus* 6692 (G, US); Rio de los Vuelos, Oaxaca, *Liebmann* 15158 (G); Cuesta de Quiotepec, Oaxaca, *Smith* 700 (G) and *Conzatti* 4027½ (G, US); Tomellin Canyon, Oaxaca, 3–4.5 m. tall, *Pringle* 4630 (G, US); between San Geronimo and La Venta, Oaxaca, *Nelson* 2785 (G, US); San Geronimo, Oaxaca, *Mell* 2133 (US); Ixtepec, Oaxaca, *Fisher* 35250 (US); Salina Cruz, Oaxaca, *Fisher* 35492 (US); Tehuantepec, Oaxaca, *Matuda* 244 (US).

The species is confined to southern Mexico and appears to be very variable. Specimens referred to it are rather diverse in appearance, but until more collections of it accumulate and more is learned of its behavior in the wild, I believe it had best be given the broad definition here accepted. From plant to plant the corolla may be moderate-sized or large and differ greatly in the length of corolla-tube protruded from the calyx. These differences, however, may possibly be associated with heterostyly. Leaf-form is variable, and so also is the type of hairs on twigs and foliage. The leaves are usually ovate or elliptic and rounded or obtuse at the base. The plant described as *C. perlonga*, however, has very elongate leaves that are acute or attenuate at the base and very scantily pubescent beneath. Its peduncles, also, are unusually elongate. The plant described as *C. urticacea* has the twigs and peduncles bristly with spreading brownish hairs. Hinton's two collections from Guerrero (nos. 10256 and 10542) show that it is not sharply distinct from other forms of the species.

2. *Cordia limicola* Brandeg. Univ. Cal. Pub. Bot. 6: 502 (1919).—Corral de Piedras, Vera Cruz, *Purpus* 8017.

Varronia limicola (Brandeg.) Friesen, Bull. Soc. Bot. Genève sér. 2, 24: 148 (1933).

Cordia passa Johnston, Jour. Arnold Arb. 29: 227 (1948).—Jacala, Hidalgo, *Chase* 7461.

MEXICO: near San Lucas, Jaumave, Tamaulipas, *Rozyński* 563 (G); Jacala, Hidalgo, *Chase* 7461 (G, TYPE of *C. passa*) and *Moore* 1823 (G); Corral de Piedras, Zacuapan, Vera Cruz, *Purpus* 8017 (G, US, ISOTYPE of *C. limicola*) and *Purpus* 7491 (G, US); Mirador, Vera Cruz, 1857, *Mohr* (US); Rio Talva, Aug. 1842, *Liebmann* 12718 (US).

A well-marked species known only from middle eastern Mexico. Its closest relatives are *C. podocephala* Torr. of northeastern Mexico and *C. mirabiloides* (Jacq.) R. & S. of Cuba and Haiti. Typical *C. passa* differs from typical *C. limicola* only in having smaller, more hairy leaves, and is obviously only an ecological form of the latter.

3. *Cordia podocephala* Torr. Bot. Report U. S. & Mex. Bound. Survey 135 (1859).
Varronia longifolia Sessé & Moc. Fl. Mex. 48 (1893), ed. 2, 44 (1894) — Type from "Praedio de la Punta."

TEXAS: Eagle Pass, Maverick Co., *Havard* 10 (G); Montell Creek, Uvalde Co., *Cory* 14902 (G), 26 mi. north of Uvalde, *Cory* 49398 (G); George West, Live Oak Co., *Skinner* 898 (US); near Dinero, Live Oak Co., 1940, *Highway Dept.* (G); Bee Co., 1940, *Tharp* (G); San Patricio Co., 1941, *Tharp* (G); 11 mi. northwest of Falfurrias, Duval Co., *Cory* 14751 (G); "Blanco Canyon, rich bottom land," *Reverchon* 1562 (US).

MEXICO: 11 mi. south of Allende, Coahuila, weak shrub 1–1.5 m. tall, *Johnston* 7023 (G); Hacienda Mariposa, Coahuila, *Wynd & Mueller* 240 (G); Musquiz, Coahuila, *Marsh* 140 (G); Soledad, southwest of Monclova, Coahuila, 1880, *Palmer* 1024 (G); Cañon Bocatoche, Coahuila, *Muller* 3112 (G); Monterrey, Nuevo Leon, *Pringle* 1877 (G, US), 11639 (G, US), and *Mueller* 322 (G); Victoria, Tamaulipas, 1907, *Palmer* 453 (G, US); Cerro Tamaulipeca, Tamaulipas, *Bartlett* 10631 (G, US); Jaumave, Tamaulipas, *Viereck* 319 (US).

A very well marked species which is closely related only to *C. limicola*. It ranges just north of the latter species in Tamaulipas, Nuevo Leon, Coahuila, and in adjoining Texas.

4. *Cordia Pringlei* Robins. Proc. Am. Acad. 26: 169 (1891).—Las Palmas, San Luis Potosi, *Pringle* 3091.

Varronia Pringlei (Robins.) Friesen, Bull. Soc. Bot. Genève sér. 2, 24: 168 (1933).

Cordia Pringlei var. *altatensis* Brandeg. Zoe 5: 219 (1904).—Yerba Buena near Altata, Sinaloa, *Brandegee*.

Cordia asterothrix Killip, Jour. Wash. Acad. 17: 330 (1927).—Rio Limon, Venezuela, *Curran & Haman* 808.

Cordia Storkii Standley, Pub. Field Mus. Bot. 18: 984 (1938).—Catalina, Guanacaste, Costa Rica, *Stork* 2758.

The species ranges in the drier parts of Mexico, Central America and northern Colombia and Venezuela.

MEXICO: Victoria, Tamaulipas, 1933, *Fisher* (G); Las Palmas, San Luis Potosi, shrub 3–4.5 m. tall, *Pringle* 3091 (G, TYPE of *C. Pringlei*; US) and 4058 (US); 100 mi. north of Tamazunchale, San Luis Potosi, 1–1.5 m. tall, *Hitchcock & Stanford* 6898 (G, US); State of San Luis Potosi, *Seler* 596 (G); Buenavista, June 1841, *Liebmann* 12714 (US); Aconsona, Vera Cruz, *Purpus* 8484 (G, US); Topolobampo, Sinaloa, 1897, *Palmer* 182 (US); Yerba Buena near Altata, Sinaloa, 1904, *Brandegee* (G, US, ISOTYPES var. *altatensis*); Mazatlan, Sinaloa, *Ortega* 5616 (US); Cerro Llano Redondo west of Caymanero, Sinaloa, 8–15 m. tall, *Gentry* 7091 (G) and 7091A (G); Buena Vista, Apatzingan, Michoacan, shrub 4 m., *Hinton* 12072 (G, US).

GUATEMALA: near Estanzuela, dept. Zacapa, 7–9 dm. tall, *Steyermark* 29102 (G); between Zacapa and Chiquimula, 2–3 m. tall, *Standley* 73784 (G) and 74448 (G); near Jutiapa, 2 m. tall, *Standley* 74969 (G).

NICARAGUA: Managua, *Garnier* 1084 (US); indefinite, *Wright* (G, US).

COSTA RICA: Bebedero, Guanacaste, *Brenes* 12546 (G, FM); Catalina, Guanacaste, 5 m. tall, *Stork* 2758 (FM, TYPE of *C. Storkii*); Puerto Jesus, Nicoya, 1903, *Cook & Doyle* 747 (US); Estero de Puerto Jesus, 1903, *Pittier* 16690 (US).

COLOMBIA: between Quebrada de Angeles and Rio Cabrera, dept. Huila, *Rusby & Pennell* 333 (G).

VENEZUELA: Rio Limon, *Curran & Haman* 808 (US, TYPE of *C. asterothrix*; G).

The species is most closely related to *C. stellata* of Mexico and to *C. macrocephala* (Desv.) HBK. of Peru and *C. polyantha* Benth. of Ecuador and northern Peru.

5. *Cordia stellata* Greenm. Proc. Am. Acad. 39: 86 (1903).—Cuicatlan, Oaxaca, *Smith* 147.

MEXICO: Cameron, Vera Cruz, *Purpus* 8715 (G, US); near San Luis Tultitlanapa, Puebla, *Purpus* 3242 (G, US); Cuicatlan, Oaxaca, *Smith* 147 (G, TYPE) and *Gonzales* 983 (G); Cuesta de Quiotepec, dist. Cuicatlan, *Conzatti* 2461 (G); Cuesta de Coyula, dist. Cuicatlan, *Conzatti* 4136 (US); 6 mi. above Domingullo, Oaxaca, *Nelson* 1646 (G, US); Cerros Teotitlan, Oaxaca, *Conzatti* 3456 (G); Rio Vuelto, Oaxaca, July 1842, *Liebmann* 12715 (US).

The plant is very closely related to *C. Pringlei*, but it is always dis-

tinguishable by its smaller heads and very short or inconspicuous tips on the calyx lobes.

6. *Cordia foliosa* Mart. & Gal. Bull. Acad. Brux. 11²: 330 (1844). — Zacuapan, Vera Cruz, *Galeotti* 7094.

Cordia chiapensis Fernald, Proc. Am. Acad. 40: 52 (1904). — Ocuilapa, Chiapas, *Nelson* 3003.

MEXICO: Corral de Piedras, Vera Cruz, *Purpus* 8062 (G); Zacuapan, Vera Cruz, *Purpus* 10785 (G, US) and 10811 (G, US); La Palmilla, *Purpus* 16410 (G); Mirador, Vera Cruz, *Liebmann* 12703 (G, US); Hacienda de la Laguna, Vera Cruz, *Schiede* 146 (NY); Ocuilapa, Chiapas, *Nelson* 3003 (G, TYPE of *C. chiapensis*; US); Monserate, Chiapas, *Purpus* 14 (US).

GUATEMALA: Puebla viejo Quen Santo, Huehuetenango, *Seler* 3011 (G); northwest of Cuilco, Huehuetenango, *Steyermark* 50806 (G).

A very well marked species and the only *Varronia* with loose, distinctly forked cymes known from Mexico and northernmost Central America.

7. *Cordia bifurcata* R. & S. Syst. 4: 466 (1819). — Based on *V. dichotoma* R. & P.; not *Cordia dichotoma* Forst. (1786).

Varronia dichotoma R. & P. Fl. Peruv. 2: 23, t. 146 (1799). — Type from Chachahuasi, Peru.

Atlantic slopes of Costa Rica and Panama and from there south along the Andes of South America.

COSTA RICA: La Colombiana Farm, prov. Limon, 2–3 m. tall, *Standley* 36641 (US); near Carmen Station, prov. Limon, 15–30 dm. tall, *Standley & Valerio* 48379 (US); Pejivalle, prov. Cartago, 1.5 m. tall, *Standley & Valerio* 46904 (US); Rio Turrialba, prov. Cartago, *J. D. Smith* 6698 (G, US); Turrialba, *Cook & Doyle* 370 (US); Juan Viñas, prov. Cartago, *Cook & Doyle* 302 (US); Valle Tuis, basin of Rio Reventazon, prov. Cartago, *Tonduz* 11353 (G, US); Aguacaliente, prov. Cartago, *Stevens* 324 (US); Rio Hondo, plains of Santa Clara, *Cook & Doyle* 530 (S); San Jose, *Tonduz* 11353 (US); Villa Quesada, prov. Alajuela, *Austin Smith* 2542 (G); Las Vueltas, Tucurrique, *Tonduz* 12759 (US).

PANAMA: Almirante, Bocas del Toro, *Cooper* 83 (G); Changuinola Valley, Bocas del Toro, *Dunlap* 90 (G); western Panama, 1923, *Stork* 16 and 19 (US).

This is one of the previously unrecognized species that has been contained in the complex, passing under the names *C. ulmifolia*, *C. corymbosa*, and *C. polycephala*. It is the common representative of the complex in Colombia and southward along the Andes into northern Argentina, and is readily delimited except where it approaches the area of its Brazilian relatives in Paraguay and northeastern Argentina. Though formerly not distinguished from the other Central American member of the complex, *C. lineata*, it is decisively separable and utterly different in appearance. In *C. bifurcata* the cymes are all terminal or internodal, and usually very evidently so. Though at times the flower clusters may be rather dense, they always show some evidence of being two-lobed and in the very mature fruiting condition always reveal a forked rhachis to some extent. Usually, however, the cyme is evidently forked even in bud and is generally very conspicuously so when in fruiting state. This is all very different from the condition in *C. lineata*, where the small, distinctly capitate inflorescences spring from axils along the leafy twigs. The foliage of the two species also differs. In our present plant the leaves usually

have a thinner texture than in *C. lineata* and are conspicuously very much less hairy, especially on the upper surface.

8. *Cordia lineata* (L.) R. & S. Syst. 4: 464 (1819).

Varronia lineata L. Syst. ed. 10, 916 (1759); Amoen. Acad. 5: 394 (1759); Sp. Pl. ed. 2, 275 (1762); Syst. ed. 12, 176 (1767). — Jamaica.

Cordia ulmifolia var. *lineata* (L.) DC. Prodr. 9: 495 (1845).

Lantana corymbosa L. Sp. Pl. 628 (1753); not *Varronia corymbosa* Desv. (1809), nor *Cordia corymbosa* Willd. (1819), nor Don (1838). — Jamaica.

Ulmarronia corymbosa (L.) Friesen, Bull. Soc. Bot. Genève, sér. 2, 24: 143 (1933), as to name-bringing synonym only.

? ? *Cordia adnata* DC. Prodr. 9: 493 (1845). — Cuba.

Ranging from southern Mexico to Panama, in the northern West Indies (Jamaica, Cuba, and Haiti), and possibly also in northern South America.

MEXICO: Zacuapan, Vera Cruz, *Purpus* 6272 (G, US) and 10825 (US); Jicaltepec, Vera Cruz, March 1841, *Liebmann* 12704 (US); Rio Cascabel, Oaxaca, *Mell* 2303 (US).

BRITISH HONDURAS: San Agustin, El Cayo Dist., *Lundell* 6756 (G, US).

GUATEMALA: Quirigua, dept. Izabel, *Standley* 23698 (G, US).

COSTA RICA: El General, *Skutch* 3831 (G, US), 4314 (G, US), and 4769 (US).

PANAMA: San Blas Dist., *Cooper* 276 (G, US); Balboa, *Standley* 25474 (G, US), 26068 (US), and 29245 (G, US); Punta Paitilla, *Heriberto* 212 (G, US); between Pacora and Chepo, *Woodson, Allen & Seibert* 1671 (G); Rio Tapia, *Standley* 28153 (US).

JAMAICA: St. Margarets Bay, *Fredholm* 3271 (US); Oxford, near Troy, *Harris* 9434 (US); indefinite, *Macfadyen* (G).

CUBA: Herradura, Pinar del Rio, *Van Hermann* 858 (G, US); between Herradura and Paso Real, *Shafer* 11769 (US); Viñales, Pinar del Rio, *Killip* 13543 (US); Los Palacios, Pinar del Rio, *Shafer* 11652 (US); Pitajones, Santa Clara, *Shafer* 12276 (US); Sancti Spiritus, Santa Clara, *Shafer* 12111 (US); Cieneguita, Santa Clara, *Combs* 420 (G); vicinity of Soledad, Santa Clara, *Jack* 5483 and 6629 (G, US); Soledad, *Howard* 6619 (G); La Gloria, Camaguey, *Shafer* 119 (G, US); Saltadero, Oriente, *Wright* 423 (G); between Levisa Bay and El Purio, Oriente, *Shafer* 3429 (US).

HAITI: St. Michel de l'Ayalaye, *Leonard* 7519 (G, US); St. Louis du Nord, *Leonard* 14289 (US); Terre Neuve, *Buch* 542 (US); Pilate, *Leonard* 9651 (US); Plaisance, *Leonard* 9173 (US); Gros Morne, l'Artibonite, *Leonard* 9852 (US); Massif du Nord, Port Margot, Bayeux, *Ekman* 2560 (US); north of Morne Jeffrard, southern peninsula, *Bartlett* 17559 (US).

DOMINICAN REPUBLIC: San Jose de las Matas, prov. Santiago, *Jimenez* 959 (US); banks of Rio Mao to La Ceiba, prov. Monte Cristy, *Valeur* 474 (US).

VENEZUELA: Perija, Zulia, *Tejera* 8 (US); between Guamitas and Rancho Grande, P. N. Aragua, *Williams* 10368 (US); La Paragua, Bolivar, *Killip* 37614 (G); Avila, savana del monte, *Vogl* 710 (G).

COLOMBIA: Boyaca, Rio Meta, Orocue, Los Llanos, *Cuatrecasas* 4401 (US).

A very well marked but previously unrecognized species here associated with a neglected specific name long ago proposed by Linnaeus. The plant is known only from Mexico, Central America, and the northern West Indies and is to be found in herbaria mistakenly identified as *C. ulmifolia*, *C. corymbosa*, or *C. polycephala*. These latter names have, at one time or another, been used to cover a complex of species distributed from Mexico and Cuba south to Argentina. A study has shown that the aggregate can be broken up into a number of well-defined species. In the West Indies, Mexico, Central America, and coastal northern South America three species

should be segregated from the complex, our present species being one of them. *Cordia polycephala* (Lam.) Johnston, *sensu str.*, is another. It ranges in the West Indies from Santo Domingo through Porto Rico, the Virgin Islands, the Lesser Antilles, and Trinidad into northern South America, where it occurs in the Guianas, Venezuela, and coastal northern Colombia. The third segregate is *C. bifurcata* R. & S., which ranges north along the cordillera into Colombia and has outlying stations on the Atlantic slopes of Panama and Costa Rica. These three species, *C. lineata*, *C. polycephala*, and *C. bifurcata* have distinct patterns of geographic distribution and are easily distinguished by differences in inflorescence.

Most of the species of the section *Varronia* have peduncles that are either terminal or internodal and never axillary. This normal condition prevails in *C. bifurcata*. In *C. lineata* and *C. polycephala s. str.*, however, while the first few inflorescences on a long shoot may be terminal or internodal, the very abundantly produced later ones are all axillary. Their peduncles arise directly from the leaf-axils along the leafy shoot and have their foot confluent with the indurated basal portion of the petiole of the subtending leaf. In *C. lineata* the peduncles are very slender, 2–3 cm. long, and terminated by a small dense capitate flower-cluster. Only exceptionally do they branch or bear a reduced leaf. They are never clustered. In *C. polycephala s. str.* the cymes are commonly glomerate and are only rarely markedly spherical in form. The peduncles are coarser than in *C. lineata* and frequently branched. They tend to be especially numerous and even paniculately arranged towards the ends of the shoot. The corolla of *C. polycephala s. str.* averages larger than that in *C. lineata* and is more abundantly glandular-hairy inside. The upper surface of its leaves is minutely tuberculate and only sparingly strigose. In *C. lineata* the distinctly lanceolate leaves are less variable in form, dry a darker color, and average more elongate than in *C. polycephala s. str.* Their upper surface is evidently more hairy, since in addition to a coarse strigosity it bears minute tuberculations, comparable to those already noted in *C. polycephala*, which are here prolonged upwards into minute appressed hairs.

In geographic distribution *C. lineata* and *C. polycephala* approach each other only in the Dominican Republic and in western northern South America. The latter species I have seen from only three general localities in the Dominican Republic (Paradis, Barahona, *Fuertes* 998; vicinity of Ciudad Trujillo, *Ekman* 12336, *Allard* 13226 & 15742; and San Pedro de Macoris, *Rose, Fitch & Russell* 4162), all near the southern coast of the country and apart from the known localities in northern and western parts of the republic where *C. lineata* has been collected. Judging from material examined, the two species remain distinct and readily separable in the West Indies. Only in Venezuela is there any difficulty in distinguishing them. In northern South America *C. polycephala* ranges as far west as Santa Marta, Colombia (*Smith* 2737) and is particularly common and well distributed in Venezuela. In the latter country, unlike its behavior in other parts of its range, however, it tends to lose its stability and is accompanied by a goodly number of variants, some of which are

separable from *C. lineata* only with difficulty. The proper interpretation of these forms must await a detailed study of the Venezuelan *Varronias*. The specimens from Colombia and Venezuela cited above can, accordingly, be now only tentatively identified with typical *C. lineata*.

The oldest name applied to the present plant is *Lantana corymbosa* L. Sp. Pl. 627 (1753). Linnaeus applied the name to Jamaican plants treated by Sloane, Hist. 2: 83, t. 194, f. 3, and Plukenet, Alm. t. 328, f. 5. Sloane's plant most suggests true *Cordia polycephala*, a plant not known from Jamaica, but in any case it is probably not the same as the plant illustrated by Plukenet. Plukenet's plant is clearly representative of *C. lineata* as here accepted. The name *Lantana corymbosa* L. cannot be transferred to *Cordia*, since the resulting combination is already preoccupied by *Cordia corymbosa* Don, 1838 (based upon *Varronia corymbosa* Desv., 1809, a renaming of *V. monosperma* Jacq.), as well as by *Cordia corymbosa* Willd. ex R. & S., 1819. The name "*Varronia corymbosa* L.," Desf. Tableau 71 (1804), possibly may have been based on *Lantana corymbosa* L., but it is published merely as a bare name in a list for a botanic garden and cannot be accepted as a nomenclatorial transfer since its association with *L. corymbosa* L. is merely conjecture.

The name *Varronia lineata* L. Syst. ed. 10, 916 (early 1759) is the second one applied to our present plant. It was published thus: "*lineata*. A. V. fol. lanceolatis linearis, spicis oblongis. Lantana corymbosa. Spec. pl. 628. Brown, jam. t. 13. f. 2." The concept is a confused one. The phrase "spicis oblongis" in the diagnosis best describes *Cordia curassavica*. Browne's plate represents *Cordia globosa*. The reference to *Lantana corymbosa* involves two other species, one of which is the species we now have under consideration.

In Nov. 1859, Linnaeus's student, Elmgren, Amoen. Acad. 5: 394, gave under the name *Varronia lineata* a very good detailed description of our present species. It was based on a specimen collected in Jamaica by Browne. The specimen is now catalogued in the Linnaean Herbarium as no. 255.1 and has been discussed by Smith, Rees Cyclop. 36: sub *V. lineata* (1817).

In Dec. 1859, another student of Linnaeus, Sandmark, Amoen. Acad. 5: 376, applied the name *V. lineata* to a plant figured in Browne's History of Jamaica. Sandmark, by his reference to the second species treated by Browne on page 172, associated the name with what is probably *Cordia curassavica*.

The application of the name *Varronia lineata*, previously confused, was finally clarified by Linnaeus in the second edition of his Species Plantarum, 275 (1762), where he treated it as follows: "*lineata*. 1. VARRONIA foliis lanceolatis lineatis, pedunculis lateralibus petiolo adnatis, spicis globosis. Amoen. acad. 5. p. 394.* *Lantana corymbosa*, foliis alternis, floribus corymbosis. Sp. pl. 628. Ulmi angustifoliae facie baccifera jamaicensis, foliis superne scabris, subtus villosis, floribus flavis perpusillis, fructu botryoide monospermo. Pluk. alm. 393, t. 328, f. 5. Habitat in America." The diagnosis is a new one and applies perfectly to our present

plant. The asterisk calls attention to the full description given by Elmgren. Sloane's plant, cited when *Lantana corymbosa* was published, is excluded by both the diagnosis and description. The Plukenet plant is the Jamaican plant here treated and the one with which Linnaeus is almost exclusively concerned in the second edition of the *Species Plantarum*. In the twelfth edition of the *System*, p. 176 (1767), the species appears as follows: "*lineata*. 1. V. fol. lanceolatis lineatis, pedunc. lateralibus petiolo adnatis, spicis globosis." This is the same diagnosis as that which first appeared in the second edition of the *Species Plantarum*, five years earlier.

In disposing of the two Linnaean names, *Lantana corymbosa* and *Varronia lineata*, there are only two choices that can be justified logically. They can be discarded as *nomina confusa*, or they can be typified by the Jamaican plant illustrated by Plukenet. The names were applied by Linnaeus to an aggregate, but to no more confused an aggregate than many other names of that author which have been subsequently restricted and are now generally accepted. In five out of the six times which Linnaeus or his students used the names between 1753 and 1767, the Jamaican plant illustrated by Plukenet was included in the species treated. It was not only a recurring element in the Linnaean concept, but also the one which Linnaeus eventually emphasized and allowed to dominate in his concept. I have accepted Plukenet's plate as typifying both *Lantana corymbosa* and *Varronia lineata*. This seems logical and furthermore is of some practical moment, since it provides a name for a species otherwise without one.

9. *Cordia coyucana* Johnston, Jour. Arnold Arb. 29: 227 (1948). — Coyuca, Guerrero, Hinton 8156.

MEXICO: Coyuca, Guerrero, 3 m. tall, Hinton 8156 (G, TYPE).

GUATEMALA: Jalapa, shrub 2 m. tall, Standley 76595 (G).

HONDURAS: (dept. Morazán): Zamorano, Valerio 139 (G); El Pedregal, Valerio 896 (G); road to Tatumbula, Valerio 532 (G).

COSTA RICA: Hacienda Santa Maria, Guanacaste, Dodge & Thomas 6294 (G); La Cruz de Guanacaste, 1890, Pittier 2751 (G).

The species is known only from the collections cited above. Although the plant has a large, plump, ellipsoidal or capitate inflorescence which is rounded at the base and hence very different from the elongating, more slender and narrower, basally attenuate spikes of *C. curassavica*, I believe it is most closely related to the latter species. In foliage, in bristly twigs, and in form and indument of the inflated fruiting calyx it is especially suggestive of those forms of *C. curassavica* found in Guerrero which have been described as *C. imparilis* Macbr. It can be noted here, as an interesting coincidence, that among the Mexican *Varronias* three very different species have developed very bristly forms in the state of Guerrero, i.e., *C. oaxacana* (*C. urticacea*), *C. curassavica* (*C. imparilis*) and *C. coyucana*.

10. *Cordia ambigua* Schl. & Cham. Linnaea 5: 115 (1830). — Jalapa, Schiede 216.

MEXICO: Jalapa, Vera Cruz, Schiede 216 (G, photo of TYPE); Jalapa, Rose & Hay 6139 (US); Jalapa, shrub 3–6 m., Pringle 8193 (G, US) and 9407 (G, US); Izuatlanchillo, near Orizaba, Vera Cruz, Boureau 2625 bis (G); near Orizaba, Boureau

2625 (G, US); Orizaba, *Botteri* 169 (G) and 181 (G); Tenango, near Orizaba, *Botteri* 482 (US); Dos Puntos, Oaxaca, Aug. 1842, *Liebmann* 12733 (US); Mt. Orando, Chiapas, *Matuda* 771 (G).

A very well marked species known only from southeastern Mexico.

11. *Cordia inermis* (Mill.), comb. nov.

Lantana inerma Miller, Dict. (1768).

Cordia cana Mart. & Gal. Bull. Acad. Brux. 11²: 331 (1844). — Pacific slope of Oaxaca, *Galeotti* 7140.

Cordia insularis Greenm. Proc. Am. Acad. 33: 482 (1898). — Maria Madre Island, *Nelson* 4296.

Ranging from northwestern Mexico south through Central America to Panama and the dry north coast of Colombia. In Mexico it is confined to the seasonally dry Pacific slope and is found as far north as Sinaloa.

MEXICO: Ymala, Sinaloa, 1891, *Palmer* 1419 (G, US); San Juan, Sinaloa, *Ortega* 4030 (US); Rosario, Sinaloa, *Rose* 1825 (G, US); San Ignacio, Sinaloa, *Montes & Salazar* 550 (US); Culican, Sinaloa, 1904, *Brandege* (G); Yervacito, Sinaloa, 1904, *Brandege* (US); Maria Madre Island, *Nelson* 4296 (G, TYPE; US), *Solis* 68, *Ferris* 5629 (US), *Howell* 10518 (G) and *Mason* 1779 (G, US); Zapotlan, Jalisco, 3 m. tall, *Pringle* 4389 (G); Sacoalco, Jalisco, *Jones* 363 (US); barranca near Guadalajara, Jalisco, 1886, *Palmer* 84 (G, US); La Palma, Jalisco, *Jones* 364 (US); Barranca de Tequila, Jalisco, 1.5–4.5 m. tall, *Pringle* 4436 (G, US); Zitacuaro to El Souse, Michoacan, tree 2 m. tall, *Hinton* 13248 (G, US); Acapulco, Guerrero, 1895, *Palmer* 2 (G, US); Acatitlan, Mexico, 1 m. tall, *Hinton* 4337 (G, US); Tenatac, Mexico, 3.5 m. tall, *Hinton* 4213 (G); Salitre, Mexico, 1.5 m. tall, *Hinton* 6510 (G, US); Tehuantepec, Oaxaca, *Matuda* 584 (G, US); Jalisco, Chiapas, *Purpus* 9211 (G, US); Mt. Orando, Chiapas, *Matuda* 683 (US).

GUATEMALA: divide between Zacapa and Chiquimula, shrub 2–3 m. tall, *Standley* 73704 (G); Gualan, Zacapa, shrub 3 m., *Deam* 6319 (G, US) and 6377 (G, US); Cobán, *Johnson* 39 and 567 (US); Guatemala City, *Tejada* 24 and 147 (US).

SALVADOR: Santa Ana, shrub 1.5–2.5 m., *Standley* 19689 (G, US); La Union, shrub 9–12 dm. tall, *Standley* 20668 (G, US); La Union, *Standley* 20843 (US); Izalco, dept. Sonsonate, *Standley* 22182 (G, US); San Salvador, *Velasco* 8926 (US) and *Calderon* 1068 (US); dept. Ahuachapán, *Sisto Alberto Padillo* 84 and 377 (US).

HONDURAS: Isla de Disposicion, 1.5 m. tall, *Stork & Worth* 8864 (G); Bella Vista, dept. Choluteca, shrub 2–3 m., *Williams & Molina* 10873 (G); Yeguaré, Morazán, *Valerio* 314 (G); Zamorano, Morazán, *Valerio* 174 (G).

NICARAGUA: Granada, *Oersted* 12799 (US); near Granada, *Maxon, Harvey & Valentine* 7624 (G, US); Managua, *Garnier* 1093 (US) and *Chaves* 9 (US); Momotombo, 1.8–2.1 m. tall, *C. L. Smith* 123 (G, US); Pueblo Nuevo, dept. Esteli, *Williams & Molina* 10808 (G).

COSTA RICA: road to Nicoya, *Tonduz* 13789 (G, US); Puntarenas, *Rowlee* 19, 65 and 141 (US); Nicoya, *Cook & Doyle* 645 (US).

PANAMA: Isla Taboga, 2 m. tall, *Woodson, Allen & Seibert* 1478 (G); Isla Taboga, 2–3 m. tall, *Standley* 27039 (US).

COLOMBIA: Santa Marta, *Smith* 582 (G, US).

For a widely ranging member of the section *Varronia* this species shows very little variation. The species usually has an indument of fine, closely appressed hairs. At the northern end of its area of dispersal the hairs, and especially those on the calyx, tend to become spreading. *Cordia insularis* was distinguished on this character.

The plant has for a century been identified, and correctly so, with *C. cana* Mart. & Gal., a species based on material from southern Oaxaca. It

was, however, named very much earlier by Miller in his *Gardeners Dictionary* as *Lantana inerma*. The type of Miller's species, preserved at the British Museum, is an unmistakable, very characteristic specimen of the present plant, labeled, subsequent to Miller's time, as having been collected by Houston. According to Miller, "The seeds of this sort were first sent me by the late Dr. Houstoun, from La Vera Cruz, but I have since received them from Jamaica." The plant, however, is known neither from Jamaica nor from Vera Cruz, Mexico, or their general vicinity. Except for mistakes as to the color of flowers and fruit, Miller's description agrees reasonably well with his type. Even the ambiguous polynomial quoted from Sloane, really applying to a very different plant of Jamaica, might fit our species also.

12. *Cordia bullata* (L.) R. & S. Syst. 4: 462 (1819).

Varronia bullata L. Syst. ed. 10, 916 (1759); *Amoen. Acad.* 5: 394 (1759); *Sp. Pl.* ed. 2, 276 (1762). — Jamaica.

Cordia asperrima DC. Prodr. 9: 498 (1845); Urban, *Symb. Ant.* 3: 360 (1903). — Jamaica, Bertero. Not *Cordia asperrima* Spreng. Syst. 1: 649 (1825), which is a *Hyptis*.

Varronia asperrima (DC.) Friesen, *Bull. Soc. Bot. Genève, sér. 2*, 24: 155, t. 1, f. 5 (1933).

? *Varronia clarendonensis* Britton, *Bull. Torr. Bot. Cl.* 41: 16 (1914). — Jamaica, Harris 10995.

The species is known only from scattered localities in Jamaica, Mexico, and Central America.

MEXICO: Xnocac, Yucatan, Gaumer 23479 (G, US); Dzitás, Yucatan, Stewart 372 (G).

GUATEMALA: La Libertad, dept. Peten, Aguilar 171 (G); near Chinana, shrub 1–1.5 m., July 1860, Hayes (G); Fiscal, dept. Guatemala, shrub 18 dm., Standley 59552 (G); near Guatemala City, Tonduz 630 (G, US); barranca near Guatemala City, 2.5–3 m., 1860, Hayes (G); indefinite, Heyde 171 (US).

SALVADOR: near Chalchuapa, Calderon 1002 (G, US).

NICARAGUA: near Granada, Maxon, Harvey & Valentine 7612 (G, US).

HONDURAS: Zamorano, dept. Morazán, Valerio 140, 175, and 1157 (G); Medina near Coyoles, dept. Yoro, Yuncker, Koepfer & Wagner 8637 (G).

JAMAICA: Farm Pen, Spanish Town, Campbell 5857 (NY); Yardly Chase, Harris 9671 (NY); upper Clarendon, Harris 10995 (TYPE of *V. clarendonensis*, NY); Indefinite, Wolle (G); Union Hill, north slope of Mt. Diable, Maxon 10417 (US).

The species has a close relative in the widely distributed *C. globosa* (Jacq.) HBK. and in *C. Bonplandii* (Desv.) R. & S. of northern Venezuela. It differs from the Venezuelan plant by having much smaller leaves and much smaller heads with less thickened calyx-tips and more elongate peduncles. Although *C. bullata* practically always can be separated at a glance from the closely related *C. globosa*, no single character has been found that decisively separates them. There are numerous differences, but these do not vary together and are not always positive. Although an honest statement of differences in the key may not be very impressive, I am of the opinion that *C. bullata* and *C. globosa* are two species worthy of recognition. Of the two, *C. bullata* is more loosely branched and has more slender and more woody twigs. Its leaves are usually ovate, sharply and frequently doubly serrate, and are sharp-pointed at the apex. They

are usually a darker green than the lanceolate or elliptic, usually bluntly toothed thinner leaves of *C. globosa*. The leaf-veins are usually much branched and anastomosing to form an evident reticulum that is usually prominent on the lower face and frequently evident as impressed lines on the upper face. The lower surface of the leaf, and generally the upper also, is therefore broken up into small areoles a few millimeters in breadth. This is generally most evident on old, very mature foliage. The upper surface has short stiff ascending bristles, usually arising from bulbous mineralized bases. On hardened old leaves, on which the veins are well impressed on the upper surface, usually only one to several bristles arise from within each areole. On the lower leaf-surface the vein-reticulum may be moderately prominent on lush new foliage or, in some plants, partially hidden by an abundance of appressed hairs. Usually, however, and especially on hardened old leaves, the reticulum on the lower leaf-face is prominent and conspicuous. The areoles on the lower face in herbarium material, when examined under a lens, usually reveal a rather distinctive development of this species. In drying there is shrinkage of tissue beneath many of the thick bases of the major bristles on the upper surface. Accordingly, within the areoles on the lower surface there are usually present tiny concave depressions. A suggestion of this development may be detected very rarely in some specimens of *C. globosa*. In *C. bullata*, however, it is practically always present, at least in some degree, and in most specimens is very evident when looked for. The flowers of *C. bullata* are borne in heads averaging perceptibly smaller than those in *C. globosa*. The peduncles of *C. bullata*, furthermore, usually become distinctly more elongate than those of its relative. The tips of its calyx-lobes tend also to be thicker and somewhat shorter than in *C. globosa*. The corolla of *C. bullata* seems to be always small. Its short tube is very hairy within and swells only moderately to form a subcampanulate throat. The usually larger corolla of *C. globosa* is funnelform with the tube flaring into a widely dilating throat. It has a well-defined hairy band inside the tube. In *C. bullata* the band is less well defined and hairs frequently occur proportionately much lower down on the tube surface.

The name *Cordia bullata* (L.) R. & S. is clearly the oldest name for the plant of Jamaica later described as *C. asperrima* DC. It was originally published as *Varronia bullata* L. Syst. ed. 10, 916 (early 1759) and treated as follows: "bullata. B. V. fol. ovatis venoso-rugosis, spicis globosis. Sloan. jam. t. 195, f. 1." The descriptive details and the cited plate both apply to the Jamaican plant later called *C. asperrima*. The name *V. bullata* next appears in the literature associated with the short original description of a Jamaican specimen collected by Browne. This was published by Elmgren, one of Linnaeus's students, Amoen. Acad. 5: 394 (Nov. 1759). The plant described is that now catalogued in the Linnaean Herbarium as no. 255.2 and is also the one discussed at length by Smith in Rees Cyclopaedia, 36: sub *Varronia bullata*. Jamaican *Cordia asperrima* is clearly represented. A month after Elmgren published his dissertation, another was published by Sandmark, Amoen. Acad. 5: 376 (Dec. 1759),

in which the name *V. bullata* was again mentioned. In this case it was associated with the first of the *Varronias* treated on page 172 of Browne's History of Jamaica. Browne's descriptive matter is ambiguous, but the plate cited, t. 13, f. 2, evidently represents the northern form of *C. globosa*. The fourth appearance of the name *V. bullata* is in the second edition of the Species Plantarum, 276 (1762). Linnaeus gave only two references as basis for the name, the first being Elmgren's description of *C. asperrima* and the second Jacquin's account of the utterly different *V. mirabiloides*.

It is to be noted that *Lantana bullata* L. Sp. Pl. 627 (1753), although a species of *Cordia*, is not synonymous with *Varronia bullata* L. Syst. ed. 10, 916 (1759). In the Species Plantarum, ed. 2, 276 (1762), Linnaeus correctly cites *Lantana bullata* as a synonym of *Varronia curassavica*.

13. *Cordia globosa* (Jacq.) HBK. var. *humilis* (Jacq.), comb. nov.

Varronia humilis Jacq. Enum. 14 (1760); Sel. Stirp. 41 (1763). — Jamaica.

Cordia humilis (Jacq.) Don, Gen. Syst. 4: 383 (1838).

Lithocardium corymbosum var. *humile* (Jacq.) Kuntze, Rev. Gen. 2: 438 (1891).

Cordia jacmeliana Krause, Beih. Bot. Centralb. 32: 344 (1914); Urban, Symb. Ant. 8: 579 (1921). — Jacmel, Haiti, Krause.

Varronia jacmeliana (Krause) Friesen, Bull. Soc. Bot. Genève, sér. 2, 24: 177 (1933).

Varronia humilis var. *mexicana* Friesen, Bull. Soc. Bot. Genève, sér. 2, 24: 162, t. 1, f. 4 (1933). — Morelos, Mexico, Pringle 6346.

Varronia mexicana Friesen, Bull. Soc. Bot. Genève, sér. 2, 24: 162 (1933).

MEXICO: Mazatlan, Sinaloa, *Rose, Standley & Russell* 13719, 14136 (US), *Howell* 10546 (US), and *Rose* 3108 (US); La Constancia, Sinaloa, shrub 4 m., *Ortega* 5518 (G, US); between Rosario and Acaponeta, Sinaloa, *Rose* 1871 (G); Topolobampo, Sinaloa, 1897, *Palmer* 180 (US); Culican, Sinaloa, shrub 2–3 m. tall, *Gentry* 7081 (G) and 7087 (G); Colima, 1897, *Palmer* 52 (G, US); Zitacuaro to Laureles, Michoacan, shrub 4 m., *Hinton* 13209 (G, US); Ixtapan, Mexico, tree, *Hinton* 1164 (G, US); near Cuernavaca, Morelos, 3–4.5 m. tall, *Pringle* 6346 (G, US); Yautepec, Morelos, *Rose, Painter & Rose* 8547 (G, US); San Luis Tultitlanapa, Puebla, *Purpus* 2472A (G, US); Mt. Male, near Porvenir, Chiapas, *Matuda* 4661 (G); Cosumel Island, *Gaumer* 126 (G); Izamal, Yucatan, *Gaumer* 801 (G, US); Progreso, Yucatan, *Lundell* 7961 (G, US).

GUATEMALA: between Rio Hondo and Santa Cruz, dept. Zacapa, shrub 2 m. *Standley* 74084 (G); Zacapa, shrub 2–3 m. tall, *Standley* 73627 (G) and 73964 (G); Chiquimula, shrub 2 m., *Standley* 73967 (G); between San Ildefonso and Cuilco, dept. Huehuetenango, *Steyermark* 50751 (G).

SALVADOR: La Libertad, shrub 1–3 m., *Standley* 23218 (G, US); Acajutla, shrub 1.5 m., *Eyerdam & Beetle* 8735 (G, US).

NICARAGUA: base of Coseguina Volcano, *Howell* 10256 (G); Santiago Volcano near Masaya, *Maxon* 7678 (US); Managua, *Chaves* 386 (US).

PANAMA: Punta Paitilla, shrub 1–2.5 m. tall, *Standley* 26268 (G, US).

The widely ranging *Cordia globosa* breaks up into two geographic varieties. The northern and western plants, those found from Florida and northwestern Mexico south through the Greater Antilles and Central America, are here distinguished as the var. *humilis*. Typical *Cordia globosa*, a plant of the Lesser Antilles, Trinidad, Venezuela, and eastern Brazil, has larger, more pointed (acute or acuminate) leaves sharply serrate on the margins. Its flower-heads are also larger. These two varieties of the species are to be detected in any large and representative

suite of specimens. The differences are not always positive, especially in the Lesser Antilles, but serve reasonably well for the separation of northern and southern plants.

The variety is typified by the Jamaican plant described and illustrated as the "Round spiked *Varronia*" by Browne, *Hist. Jam.* 172, t. 13, f. 2, since Jacquin specially mentioned it when he described *Varronia humilis*. The plant described as *V. globosa* by Jacquin is evidently the southern plant. He stated that it resembled his *V. martinicensis*, but differed in flowers and inflorescence. In size and form of leaves the southern plant is indeed very similar to *C. martinicensis* as illustrated by Jacquin, *Sel. Stirp.* 41, t. 32 (1763).

14. *Cordia curassavica* (Jacq.) R. & S. *Syst.* 4: 460 (1819).

Varronia curassavica Jacq. *Enum.* 14 (1760) and *Sel. Stirp.* 40 (1763). — Curaçao. *Lantana bullata* L. *Sp. Pl.* 627 (1753). Not *V. bullata* L. (1759) nor *C. bullata* R. & S. (1819). — Jamaica.

Varronia macrostachya Jacq. *Enum.* 14 (1760) and *Sel. Stirp.* 41 (1763). — Cartagena, Colombia.

Cordia macrostachia (Jacq.) R. & S. *Syst.* 4: 461 (1819).

Cordia brevispicata Mart. & Gal. *Bull. Acad. Brux.* 11²: 331 (1844). — Tehuacan, Puebla, *Galeotti* 7192.

? *Cordia peruviana* var. *mexicana* DC. *Prodr.* 9: 491 (1845). — Campeche.

Cordia linearis DC. *Prodr.* 9: 493 (1845). — Mexico, *herb. Pavon.*

Cordia hispida Benth. *Bot. Sulphur* 139 (1845). — Gulf of Fonseca, *Sinclair.*

Cordia Palmeri Wats. *Proc. Am. Acad.* 24: 62 (1889). — Guaymas, Sonora, *Palmer* 281.

Cordia socorrensis Brandeg. *Erythea* 7: 5 (1899). — Socorro Island, *Anthony* 384.

Cordia brevispicata var. *hypomalaca* Greenm. *Field Mus. Pub. Bot.* 2: 338 (1912). — Cerro San Felipe, Oaxaca, *Conzatti* 1831.

Cordia imparilis Macbride, *Contr. Gray Herb.* 49: 16 (1917). — Banio nuevo, Michoacan or Guerrero, *Langlassé* 265.

Cordia chepensis Pittier, *Contr. U. S. Nat. Herb.* 18: 253 (1917). — Chepo, Panama, *Pittier* 4511.

Cordia littoralis Pittier, *Contr. U. S. Nat. Herb.* 18: 253 (1917). — Porto Limon, Costa Rica, *Pittier* 3641.

Cordia mollis Pittier, *Contr. U. S. Nat. Herb.* 18: 294 (1917). — between Guatemala City and Salama, *Pittier* 134.

Ranging from Mexico and Cuba south through Central America and the West Indies into northern South America. In Mexico the plant grows along the Pacific slope in the western and southern parts of the country, extending as far north as middle Baja California and middle-western Sonora. Only in Yucatan is it found on the Caribbean slopes of Mexico. In Central America it occurs on both slopes but apparently with greater frequency on the Pacific.

The species is very widely ranging and includes very diverse forms. It has accumulated a formidable list of synonyms. The names given above include only the very oldest few and those based upon plants originating in Mexico and Central America. Although readily distinguishable by its inflorescence, our plant has been frequently confused with *C. cylindrostachya* (R. & P.) R. & S. and its allies, of northwestern South America. The latter range along the Andes from Colombia to Bolivia and produce most of their spikes directly from leaf-axils along leafy twigs, only the

very first produced on the shoot being terminal. The spikes of *C. curassavica*, on the other hand, are all terminal. By subsequent elongation of the twig, however, the spikes may appear to arise from stem-forks or, still on naked peduncles and without subtending leaves, from internodes along leafy stems. None of the spikes in *C. curassavica* ever arise from the leaf-axils.

The oldest name for this widely distributed plant is *Lantana bullata* L. Sp. Pl. 627 (1753). The description of the species records it as "spicis oblongis" and as originating in Jamaica. Linnaeus's knowledge of it was apparently derived entirely from the writings of Plukenet and Sloane. Of the three references given, one is to the works of the former and two to the latter. The first given is to Plukenet, Alm. 329, t. 221, f. 3, and clearly applies to a form of *C. curassavica*. The second reference, *Periclymenum . . . folio majore oblongo bullato . . .*, Sloane, Hist. 2: 81, applies to a close relative of *C. curassavica*. The third reference, however, *Periclymenum . . . folio majore subrotundo bullato*, Sloane, Hist. 2: 81, t. 195, f. 1, involves a very different species, one bearing flowers in heads, which Linnaeus, Syst. ed. 10, 916 (1759), later distinguished as *Varronia bullata*. In the second edition of the Species Plantarum 2: 276 (1762), Linnaeus cited *Lantana bullata* (without name) as a synonym of *Varronia curassavica* Jacq. Of the three references originally given for *Lantana bullata* only the first of the two Sloanean ones is repeated in his synonymy of Jacquin's species. It is to be particularly noted that the significant phrase, "spicis oblongis," first used in 1753, again appears in his diagnosis of *C. curassavica*. Although the name *Lantana bullata* L. (1753) much antedates *Verronia curassavica* Jacq. (1760), it cannot be transferred to *Cordia* or *Varronia*, since the resulting combination would be a homonym of *C. bullata* R. & S. (1819) or *V. bullata* L. (1759).

The next available names for our plant are *Varronia curassavica* Jacq. and *V. macrostachya* Jacq. These were first published in Jacquin's Enumeratio, p. 14 (1760) as follows:

"*curassavica* 1. VARRONIA spicis oblongis; foliis lanceolatis. h Brown. Jam. 2. p. 172.

"*macrostachya* 2. ——— spicis oblongis; foliis lanceolato-oblongis. h ." Three years later they were again treated, with more detail, by Jacquin, Sel. Stirp. p. 40-41 (1763), as follows:

"1 VARRONIA spicis oblongis; foliis lanceolatis. Varronia assurgens sarmentosa, foliis & capitulis oblongis. Brown. jam. 2. p. 172. Frutex quindecimipedalis; ramis teretibus, scabris, senioribus ferrugineis. Folia lanceolata, acuta, serrata, rugosa, venosa, facie scabra, petiolata, alterna. Spicae densae, terminales, duos tresve pollices longae, insidentes pedunculo bipollicari. Flores parvi, inodori. Calycis inflati lacinae subovatae desinunt in denticulos setaceos ejusdem secum longitudinis. Corollae albae tubus longitudine calycem aequat; limbus brevis est & emarginatus. Stamina petalo sunt paulo breviora. Stylus etiam brevis stigmatate capitato simplicique instructus. Drupa rubra & parva est. Habitat in Curaçao in sepibus arboreis.

"2. VARRONIA (*macrostachia*) spicis oblongis; foliis lanceolato-oblongis. Arbuscula erecta, duodecimpedalis. Spicae semipedalis. Folia angusta, semipedalis. Reliqua, ut in praecedente. Habitat Carthagenae in fruticosis & silvaticis."

It will be noted that the trivial name *curassavica* was omitted in the second publication. The lengthy discussion published in 1763, however, evidently applies to *V. curassavica*.

I have come to the conclusion that Jacquin's two binomials apply to forms of a single species. *Varronia curassavica* is the common xerophytic phase, and *V. macrostachya* is the more luxuriant mesophytic phase of the most common of the spicate *Varronias* in northern South America. This is a departure from some recent usage in which *V. curassavica* has been applied to the plant distinguishable as *C. divaricata* HBK.*

The identity of *V. macrostachya* is readily established since there is only one species to which it is possibly applicable that has been found at its type locality (Cartagena) and in ecologically similar stations (Barranquilla, Santa Marta) on the dry north coast of Colombia. Jacquin says that *V. macrostachya* differs from *V. curassavica* in being a shrub 3.6 m. (rather than 4.5 m.) tall, in having spikes 15 cm. (rather than 5–7.5 cm.) long, and in having lance-oblong (rather than lanceolate) leaves reaching 15 cm. in length. The elongate spikes and large leaves indicate that he had one of the luxuriant mesophytic phases of the species repeatedly collected near the ports of northern Colombia.

The specific name selected by Jacquin when he named *V. curassavica* makes it desirable that the binomial should apply to some plant of Curaçao. Only two spicate *Varronias* occur on the island. Judging from the relative number of collections made there, *C. divaricata* must be rare or local on the island, and the xerophytic phase of the plant named *V. macrostachya* must be common and widely distributed there. The latter seems to be the plant to which the name *V. curassavica* belongs. Jacquin's description of the leaves of the island plant, "lanceolate" and "acute," certainly apply best to it. Had Jacquin possessed material of *C. divaricata*, he would certainly have mentioned the hairy upper leaf-faces in distinguishing it from the plant of Cartagena. He does speak of the scabrous leaves of *V. curassavica*, but this almost certainly refers to the harshness resulting from the great numbers of minute siliceous tubercles usually present on the glabrous upper surface of the xerophytic form of *V. macrostachya*. If *V. curassavica* is taken as one of two possible species of Curaçao and is judged by comparisons with *V. macrostachya*, its identity

* A species widely distributed in northern Venezuela and best known from the region about Caracas. It extends into northeastern Colombia and is present on Curaçao and also on Dominica and Martinique. It differs from *C. curassavica* in having leaves broadest at or above the middle, round at the apex, usually strongly crenate or toothed on the margin, and commonly soft-hairy on the upper surface. The calyx-lobes tend to be shorter and proportionately broader, and the corolla-lobes are usually more erose-denticulate and crisped than in *C. curassavica*. *C. cuneiformis* DC. is a synonym.

seems clear. *Varronia curassavica* and *V. macrostachya* are forms of one species.

Some of the details in Jacquin's later discussion of *V. curassavica*, however, are puzzling. They agree neither with *C. divaricata* nor with forms of *V. macrostachya*. They suggest that Jacquin's notes may have been faulty, that he may have been misled by extraneous material associated with his specimens, or that there was some confusion in his manuscript. In the first place he states that *V. curassavica* grew 4.5 m. tall, a height which is certainly unusual if not greatly excessive for the species. Most important, however, he gives the calyx as inflated and having subovate lobes prolonged into setaceous tips. This agrees with the calyx of *Varronia globosa* Jacq., a species with capitate inflorescences common on Curaçao, but certainly not with any of the spicate *Varronias* known from the island or from Venezuela. Indeed almost all of the details given for the flowers of *V. curassavica* could apply better to *V. globosa*. It is surprising that Jacquin, in his description of *V. globosa*, made no mention of the setaceous tips of the calyx-lobes, one of the most conspicuous and distinctive traits of that species. Finding reference to such structures in Jacquin's description of *V. curassavica*, where they certainly do not belong, I am willing to believe that the notes on flowers and fruit appearing there may have been intended for his account of *V. globosa* and were somehow misplaced. Fortunately, the confusion described can be overlooked, since it does not appear in the *Enumeratio* (1760), where the species were established. It appears only in the *Stirpium* (1763), his second amplified treatment of the species, where by oversight even the specific name "*curassavica*" was omitted. Since we are able to associate it with one of the two spicate *Varronias* of Curaçao, the name *V. curassavica* can be used. Moreover, it is preferred to *macrostachya* in combining Jacquin's two species, since it belongs to the species originally given priority of position and a fuller discussion. Also it has been more frequently used by subsequent authors and is hence the more familiar name.

In the present paper I have defined *C. curassavica* very broadly, for the simple reason that I have not had time to give the Mexican and Central American plants of this complex group the study they need. I have included under it some very diverse forms which will almost certainly be treated eventually as separate species. The diverse forms of Mexico and certain hairy plants of Central America are in many ways more similar to plants of the Greater Antilles than to typical *C. curassavica*, and must be studied with the former.

Typical *C. curassavica* is known only from northern South America from the Guianas to Colombia, and extends north only to Martinique and Yucatan. In our region it has synonyms in *C. chepensis* Pittier and *C. littoralis* Pittier. It is the only form of the present aggregate found in Panama. Specimens in the Gray Herbarium representing typical *C. curassavica* from Central America are as follows:

PANAMA: Chepo, Pittier 4511 (*C. chepensis* Pittier); Balboa, Standley 25552 and 27152; Ancon Hill, Killip 12059; Race Track near Panama, Standley 27795; Bella

Vista, *Maxon & Valentine 6945*; Miraflores Lake, *White 244*; Isla Taboga, *Woodson, Allen & Seibert 1485*; Aguadulce, Coclé, *Pittier 4860*; between Aguadulce and Anton, *Woodson, Allen & Seibert 1207*; El Valle, Coclé, *Allen 100* and *753*, *Seibert 439*; between Las Margaritas and El Valle, *Woodson, Allen & Seibert 1293*; Manzanillo Island, *Hayes 5*; Chagres, *Fendler 130*; near Chiriqui Lagoon, Bocas del Toro, *Wedel 562, 2478, 2608, and 2923*.

COSTA RICA: Port Limon, *Pittier 3641* (*C. littoralis* Pittier).

SALVADOR: Acajutla, *Beetle 8730*.

NICARAGUA: San Juan del Norte, *C. L. Smith 91*.

GUATEMALA: Jutiapa, *Standley 75263*.

BRITISH HONDURAS: Manatee Lagoon, *Peck 65*; Lower Belize River, *Record*; New Town, *Schipp 821*; Bakers Pine Ridge, *Lundell 7002*; Honey Camp, *Lundell 508*; San Antonio, Corozal, *Lundell 4986*.

MEXICO: Yucatan, Chankon, *Bequaert 84*; indefinite, *Gaumer 24027* and *24234*; Quintana Roo, Lake Coba, *Lundell 7686*; Campeche, Hecelchakan, *Stewart 11*.

15. *Cordia costaricensis*, sp. nov.

Frutex scandens, ramulis minute brunneo-pubescentibus, internodiis 1–7 cm. longis; foliis alternis late lanceolatis penninervis reticulato-venosis, majoribus 10–15 cm. longis et infra medium 5–6 cm. latis, apice acutis acuminatisve, basi obtusis vel rotundis, margine minute sed distincte serratis, facie superiori minute papillatis pilis rigidis ad 0.5 mm. longis plus minusve donatis rare subglabris, facie inferiori pilis minutis mollibus 0.2–0.5 mm. longis plus minusve donatis; petiolo 1–3 cm. longo cum pedunculo vel ramo axillari basi connato; spicis densis vel laxis 2–8 cm. longis ad 8 mm. crassis 1–3 cm. longe pedunculatis in paniculis laxis 15–25 cm. longis terminalis vel axillaribus paucissime foliatis gestis; calyce sessile fere ad medium lobato, in alabastro late obovato 2–3 mm. crasso summum ad apicem rotundatum apices liberes loborum 0.2–0.5 mm. longas prore-
renti, extus subglabro vel supra medium pilis minutis rigidulis sparse obsito, intus glaberrimo, sub anthesi 4–5 mm. longo basi et paulo supra basem 1–1.5 mm. crasso deinde sursum gradatim ampliato apice 4–5 mm. diametro; lobis calycis ascendentibus deltoideis vel ovato-deltoideis, apice apiculatis et subincrassatis, sinibus acutis; corolla campanulata 5–6 mm. longa, basi 1.5–2 mm. crassa ceinde sursum ampliata, apice 5–6 mm. diametro, margine erosa haud lobata, extus glabra, intus sub insertione staminum villosa alibi glabra; staminibus inclusis, antheris 1 mm. longis, filamentis 2.5 mm. longis; ovario cum stylo glabro; fructu ignoto.

COSTA RICA: Vicinity of El General, prov. San Jose, 1190 m. alt., scandent shrub, edge of forest, fl. white, Aug. 1936, *A. F. Skutch 2828* (TYPE, Gray Herb.); Vara Blanca de Sarapiquí, north slope of Central Cordillera, 1500–1750 m. alt., in thicket, fl. white, July–Sept. 1937, *Skutch 3175* (G).

A very well marked species with its closest relations in *C. multispicata* Cham. of eastern Brazil. From that species it differs in its somewhat larger and more elongate leaves, axillary panicles of spikes, and tubular erose-margined corollas.

16. *Cordia spinescens* L. Mant. 2: 206 (1771).—“India orientali.”

Varronia ferruginea Lam. Tab. Encyc. 1: 418 (1791); Poir., Encyc. 4: 263 (1797);

Desv. Jour. de Bot. 1: 266, t. 9 (1809).—Based on plants cultivated at Paris.

Cordia ferruginea (Lam.) R. & S. Syst. 4: 458 (1819).

Cordia riparia HBK. Nov. Gen. et Sp. 3: 71, t. 207 (1818).—Type from Mompox, Magdalena Valley, Colombia.

Cordia laxiflora HBK. Nov. Gen. et Sp. 3: 72 (1818).—Between Mompox and Morales, Magdalena Valley, Colombia.

Cordia pyrifolia Willd. ex R. & S. 4: 802 (1819). — South America.

Cordia Thibaudiana DC. Prodr. 9: 489 (1845). — America.

Cordia crenulata A.DC. Prodr. 9: 492 (1845). — Mexico, *herb. Pavon.*

Varronia crenulata Sessé & Moc. Fl. Mex. 48 (1893), ed. 2, 44 (1894). — From Orizaba, Mexico.

Cordia pauciflora Rusby, Mem. Torr. Bot. Cl. 6: 83 (1896). — Near Cochabamba, Bolivia, *Bang 1291.*

Ranging from Mexico southward through Central America into Colombia and from there south along the Andes to Bolivia. In Mexico it is practically confined to lower altitudes towards the coasts and is found as far north as Nayarit and middle Vera Cruz. Most of the many specimens examined come from Mexico, Guatemala, and Panama.

This species has been called *C. ferruginea* (Lam.) R. & S. It has, however, an older name in *Cordia spinescens* L. This latter was based upon a specimen still preserved in the Linnaean Herbarium. It was launched with a detailed description, but, unfortunately, was mistakenly said to be an East Indian plant. Unrecognized by botanists in the Old World and unstudied by botanists in America the species has remained neglected and unplaced. No *Cordia* remotely suggesting it is known from the Old World. It is, however, indistinguishable from the well-known American species usually called *C. ferruginea*. The type of *C. spinescens* has a few spikes and numerous developing axillary shoots and the general appearance of growing in a botanic garden away from its natural environment. I suspect that it may have been grown from seeds sent from Colombia by Mutis or have been derived from plants of other sources grown at Madrid or Paris. The species is known to have been in cultivation in Europe in the late eighteenth century. The synonymous *C. ferruginea*, indeed, was based on plants growing at Paris sometime previous to 1791. The specific name "*spinescens*" adopted by Linnaeus refers to the decurved spurs, persisting indurated basal portions of petioles, that are very well developed along the clambering shoots of this shrub.

B. THE IDENTITY OF SPECIES PROPOSED BY SESSÉ AND MOCIÑO

A very large number of puzzling species were published about fifty years ago, when the manuscripts of Sessé & Mociño were dug out of the archives at Madrid and printed in Mexico as the "Flora Mexicana" and "Plantae Novae Hispanicae." The Boraginaceae described in these works mostly defied identification. On various trips to Europe, accordingly, I methodically recorded the data on all specimens believed to be collections of Sessé & Mociño. Notes were also made on the set of Mociño drawings at Geneva. In 1936, when the Sessé & Mociño herbarium at Madrid was loaned to the Chicago Natural History Museum for study, I was allowed to examine all the Boraginaceae it contained. With data assembled from the sources mentioned it is now possible to identify with reasonable accuracy the species first published in the posthumous writings of Sessé & Mociño. Only those species which the authors themselves obviously in-

tended as new proposals are here discussed, since only these have any nomenclatorial importance. The many misidentifications contained in the work are properly ignored.

The specimens from Madrid commonly bear the identification of Sessé & Mociño and frequently also their collection number, but never any geographical data. To facilitate reference, a new set of herbarium numbers was applied to the sheets in the collection after it arrived at Chicago. In referring to the Sessé & Mociño material belonging to Madrid, this new set of numbers has been used. For each collection mentioned I have given its recently assigned number, and, when it is not an unpublished binomial, have given the Sessé & Mociño identification also.

The study of the Sessé & Mociño borages has made it clear that the authors either collected in northern Mexico or had collaborators there. In the past it has been generally stated that their material came only from central and southern Mexico, Guatemala, Cuba, and Porto Rico. Rickett has recently found proof that northwestern Mexico was another source. Northeastern parts of the country, very likely the vicinity of Monterrey, are also to be included. This is evidenced by the presence in the Sessé & Mociño herbarium of material of *Cordia podocephala* Torr., *Cordia Boissieri* DC., *Ehretia Anacuna* (Berl.) Johnston, and especially *Omphalodes aliena* Gray.

Cordia alliodora (R. & P.) Cham.

Varronia tuberosa S. & M. Pl. N. Hisp. 30 (1888), ed. 2, 28 (1893). — From Metepec, Vera Cruz.

The material of this species assembled by Sessé & Mociño and now at Madrid is numbered and bears original identifications as follows: 752 (*Cerdana*), 1352 (*Varronia tuberosa*), 1366 (*Cordia nodosa*), 1452 (without name), 1568 (*Cordia Gerascanthus*), 1569 (*Cerdana*), 5275 (*Cordia globosa*). A specimen at Oxford is labeled "*Varronia tuberosa*, Mexico ex herb Ruiz."

When *Varronia tuberosa* was described reference was given to "Fl. Mex. Ic. 193." This plate number appears on no. 882 of DeCandolle's copies of the Mociño plates at Geneva. The plate is labeled "*Cordia nodosa*," a name apparently originating with Sessé & Mociño. It is incorrectly cited under *Cordia nodosa* Lam. in the Prodr. 9: 475 (1845).

Cordia diversifolia Pavon ex DC.

Cordia paniculata S. & M. Fl. Mex. 49 (1894), ed. 2, 45 (1894). — Habitat in Opido de la Punta, ? Vera Cruz.

An unidentified specimen at Madrid bears the number 760. It is conspecific and probably a duplicate of at least the Mexican specimen from Pavon's herbarium cited by DeCandolle, Prodr. 9: 474 (1845), when he described *C. diversifolia*.

Cordia dodecandra DC.

Cordia dodecandra S. & M. Fl. Mex. 50 (1894), ed. 2, 46 (1894). — From coast at Alvarado, Vera Cruz.

This species is represented by an unidentified specimen, no. 758 bis, at Madrid, and also by a fine colored plate, tab. 874, among the copies of

the Mociño drawings at Geneva. The plant, bearing the name "*Cordia dodecandra*," is the basis upon which DeCandolle, Prodr. 9: 478 (1845), described the species.

***Cordia elaeagnoides* DC.**

? *Cordia exsucca* S. & M. Fl. Mex. 49 (1894), ed. 2, 45 (1894).—Habitat in Apataingani [Michoacan] aliisque calidissimis Novae Hispaniae locis.

I have seen no material collected by Sessé & Mociño and am able to judge their *C. exsucca* only from the description. This fits *C. elaeagnoides* DC. reasonably well.

***Cordia pauciflora* DC. ex Ramirez, Estud. Hist. Nat. 295 (1904), not Rusby (1896).**

Ramirez identifies plate 877 of the set of Sessé & Mociño plates at Geneva with plate 25 of the set at Madrid and associates them with "*Cordia Sebestena*, Jacq.—*Plantae Novae Hispaniae* pag. 28. Ic. 36." The plate at Geneva is very sketchy, being only a poor pencil outline. It bears the name "*Cordia pauciflora*," which probably originated with Sessé & Mociño. In general habit the sketch most suggests a species of *Bourreria*. I do not believe it is the same as *Cordia Sebestena* sensu Sessé & Mociño, Pl. N. Hisp. 30 (1888), ed. 2, 28 (1893), which is given as originating in dry fields near Cuernavaca. Ramirez's publication of the name "*Cordia pauciflora*" consists of mere casual mention. No description is given.

***Cordia podocephala* Torr.**

Varronia longifolia S. & M. Fl. Mex. 48 (1893), ed. 2, 44 (1894).—Habitat in Praedio de la Punta, ? Vera Cruz.

A specimen at Madrid, no. 5269, bears the name "*Varronia longifolia* N." The plant is unquestionably conspecific with *C. podocephala*, known only from northeastern Mexico and adjacent Texas. The published description of *V. longifolia* agrees with Torrey's species, also.

***Cordia spinescens* L.**

Varronia crenulata S. & M. Fl. Mex. 48 (1893) ed. 2, 44 (1894).—From the vicinity of Orizaba, Vera Cruz.

Material at Madrid representative of the species is as follows: 739 (*Varronia crenulata*), 740 (without name), 741 (without name), 742 (without name), 5262 (new sp. aff. *spinescens*), 5264 (*Varronia spinescens*), 5273 (*Varronia crenulata*). Judging from similarities in material I would say that parts of only three different collections are represented in the suite cited. The type of *Cordia crenulata* DC., Prodr. 9: 492 (1845), is almost certainly a duplicate of one of these collections.

***Ehretia Anacuna* (Berl.) Johnston**

Ehretia lancifolia S. & M. Fl. Mex. 51 (1894), ed. 2, 44 (1894).—Habitat in Texcuco.

Representative specimens of the species at Madrid are as follows: 773 (*E. lancifolia*), 774 (*Ehretia* sp. nov.), 775 (without name), 5247 (*Ehretia* sp. nov.), 5250 (*E. lancifolia*, communicavit D. Ignatius de Leon, Horti Reg. Mex. Alumnus). Judging from general appearance, the material cited probably consists of duplicates of no more than two different collec-

tions, one bearing the name *E. lancifolia* and the other an unpublished binomial. The species is known as a wild plant only in northeastern Mexico and adjacent Texas, but I have seen cultivated specimens of it from as far south in Mexico as Guanajuato.

Bourreria rotata (DC.) comb. nov.

Cordia rotata Mociño ex DC., Prodr. 9: 483 (1849).

Ehretia calophylla Richard in Sagra, Fl. Cubana 2: 112, t. 61 (1853).

Bourreria calophylla (Rich.) Wright in Sauvalle, Fl. Cubana 110 (1870); Schulz in Urban, Symb. Ant. 7: 52 (1911).

The species described by DeCandolle is based upon a handsome colored plate, no. 880, in the set of Mociño drawings at Geneva. The plate shows a plant with the characteristic forking style of a *Cordia*, but in all other details it is a remarkably good representation of the Cuban plant now current as *Bourreria calophylla*. The forked style is evidently a mistake of the artist.

Bourreria spathulata (Miers) Hemsley

Ehretia cuneifolia S. & M. Fl. Mex. 51 (1894), ed. 2, 47 (1894).—From Chilpanzingo, Guerrero.

Two collections of the species are at Madrid: 1354 (*Ehretia exsucca*) and 5252 (*Ehretia cuneifolia*, olim *exsucca*). A fine original colored plate of the species occurs among the Mociño plates at Geneva, no. 887. It bears an unpublished binomial, under *Ehretia*, and also Mociño's number, 292. This latter was cited when *Ehretia cuneifolia* was described. Miers based his species upon a plant from Pavon's herbarium. The type is almost certainly a duplicate of one of the two Madrid specimens cited above.

Heliotropium angiospermum Murr.

Heliotropium lancifolium S. & M. Fl. Mex. 31 (1893), ed. 2, 29 (1894).—Cuernavaca, Morelos.

Cerithe lanceolata S. & M. Pl. N. Hisp. 20 (1888), ed. 2, 19 (1893).—Cuernavaca, Morelos.

The herbarium at Madrid contains a number of specimens of this species: 858 (*Heliotropium* sp., *Cerithe lanceolata*), 1384 (*Heliotropium indicum*), 1718 (*Heliotropium lancifolium*), 1719 (*Heliotropium* sp. nov.), 1722 (*Heliotropium parviflorum*), 5254 (*Heliotropium parviflorum*). Some of the material probably came from Havana and is that treated as *H. parviflorum* in Flora Mexicana 31 (1893), ed. 2, 28 (1894).

Heliotropium assurgens Johnston

Anchusa incana S. & M. Fl. Mex. 33 (1893), ed. 2, 30 (1894).—Cuernavaca, Morelos.

Two specimens at Madrid clearly belong to this species: 931 (*Lithospermum* olim *Anchusa incana*) and 1435 (*Anchusa incana*).

Heliotropium calcicola Fernald

Symphitum fruticosum S. & M. Pl. N. Hisp. 21 (1888), ed. 2, 20 (1893).—Chilpancingo, Guerrero.

There are three specimens at Madrid, 861 (*Heliotropium frutescens*), 1716 (*Heliotropium* sp. nov.), and 5256 (*Heliotropium* sp. nov.). They

are so similar in appearance that they may well be only duplicates of a single collection. At Geneva there is a beautiful plate of the species, tab. 901, labeled *Symphitum fruticosum* and bearing the number 288 of Sessé & Mociño's series of plates. This latter number is cited in Sessé & Mociño's account of *S. fruticosum*. *Antiphytum mexicanum* DC., Prodr. 10: 121 (1846), was based entirely upon the plate at Geneva.

Heliotropium oaxacanum DC.

Lithospermum rosmarinifolium S. & M. Fl. Mex. 33 (1893), ed. 2, 30 (1894).—
From Uruapam, Michoacan.

Anchusa depressa S. & M. Pl. N. Hisp. 21 (1888), ed. 2, 20 (1893).—From Uruapam, Michoacan.

Representative of the species at Madrid is one specimen, no. 5238. This is associated with an unpublished binomial of which "*rosmarinifolium*" is the specific adjective. The descriptions of Sessé & Mociño apply reasonably well to *H. oaxacanum* DC., and I am content to refer this proposed species to the synonymy of it.

Heliotropium Sessei Johnston

Myosotis mexicana S. & M. Fl. Mex. 33 (1893), ed. 2, 31 (1894).—In temperatis N. Hispan. montibus.

Two specimens are preserved at Madrid, 1725 (*Myosotis mexicana*) and 5229 (*Myosotis mexicana*). They are probably duplicates of a single collection. The description of *Myosotis mexicana* fits them reasonably well. The species is known only from Sierra de la Mesa, Hidalgo (*Purpus* 1402 and *Rose, Painter & Rose* 9122) and from Sessé & Mociño's collections cited above.

Tournefortia bicolor Sw.

Tournefortia laevis S. & M. Fl. Mex. 52 (1894), ed. 2, 48 (1894).—Habitat in Novae Hispaniae regionibus.

A specimen at Madrid represents Sessé & Mociño's species, 1712 (*T. laevis*).

Tournefortia hirsutissima L.

Tournefortia odorata S. & M. Fl. Mex. 52 (1894), ed. 2, 48 (1894).—Habitat in Apatzingani [Michoacan].

Several collections of this species are at Madrid, most of them under unpublished names: 1705 (*T. suffruticosa*), 1706 (*Tournefortia* n. sp.), 1707 (*Tournefortia* sp. nov.), 1715 (*Tournefortia* sp. nov.), 5261 (*Tournefortia* sp. nov.). I suspect that no. 1707 may be the type of *T. odorata*. The other collections are perhaps those described as *T. suffruticosa* sensu S. & M. Fl. Mex. 52 (1894), ed. 2, 48 (1894), and *T. cymosa* sensu S. & M. Pl. N. Hisp. 31 (1888), ed. 2, 29 (1893). These latter two names apply to plants from San Juan de los Platanos near Apatzingan, Michoacan.

Tournefortia syringaefolia Vahl

Tournefortia lanceolata S. & M. Fl. Mex. 52 (1894), ed. 2, 48 (1894).—From mountains near Tuxtla, Vera Cruz.

Two specimens representative of *T. syringaefolia* (*T. peruviana*) are found at Madrid: 1711 (*T. lanceolata*) and 5260 (*Tournefortia* n. sp.). One is probably the type of *T. lanceolata* S. & M.

Lithospermum distichum Ortega

Lithospermum laevigatum S. & M. Fl. Mex. 32 (1893), ed. 2, 30 (1894). — Habitat in montibus Predii S. Nicolai [state of Mexico].

? *Anchusa mexicana* S. & M. Pl. N. Hisp. 21 (1888), ed. 2, 20 (1893). — Mountains of Patzquaro, Michoacan.

I have seen two specimens from Madrid representative of *L. distichum*, viz., 1732 (*Lithospermum laevigatum*) and 5226 (*Lithospermum* n. sp.). No specimen identified as "*Anchusa mexicana*" has been encountered. The original description of that species, however, agrees reasonably well with *L. distichum*, and I am content to refer it to the synonymy of the latter.

Lithospermum discolor Mart. & Gal.

Lithospermum obtusiflorum S. & M. Fl. Mex. 32 (1893), ed. 2, 29 (1894). — Habitat in montibus Oppido de El Valle.

Two specimens at Madrid belong here: 1737 (*L. obtusiflorum*) and 5232 (*L. obtusiflorum*). Specimens in the Boissier Herbarium labeled "Nueva Espana, herb. Pavon, *Lithospermum obtusiflorum*," are also referable to *L. discolor*.

Lithospermum strictum Lehm.

Lithospermum angustifolium S. & M. Fl. Mex. 32 (1893), ed. 2, 29 (1894). — From Ario, Michoacan.

Heliotropium mexicanum S. & M. Pl. N. Hisp. 20 (1888), ed. 2, 19 (1893). — Habitat in Sancti Angeli hortis, Valley of Mexico.

Lithospermum rosmarinifolium S. & M. Pl. N. Hisp. 20 (1888), ed. 2, 19 (1893). — Habitat in Oppido Ario, Michoacan. Not *L. rosmarinifolium* S. & M. Fl. Mex. 33 (1893), ed. 2, 30 (1894), which equals *Heliotropium oaxacatum* DC.

Three specimens from Madrid have been seen, viz., 1389 (*Heliotropium mexicanum*), 1734 (*Lithospermum angustifolium*), and 5234 (*Lithospermum angustifolium*). Among the drawings at Geneva there is a poor pencil sketch, no. 1174, labeled "*Heliotropium mexicanum*." In both of the large herbaria at Geneva there are specimens from the Pavon herbarium bearing the name "*Lithospermum angustifolium*." The description accompanying the name *L. rosmarinifolium* in the *Plantae Novae Hispaniae* is a repetition of that associated with *Lithospermum angustifolium* in the *Flora Mexicana*. The names, accordingly, must be synonymous.

Macromeria exserta Don

Echium longiflorum S. & M. Pl. N. Hisp. 20 (1888), ed. 2, 19 (1893). — Habitat in Mazatlani et Chilpanzingi montibus, Guerrero.

One specimen from Madrid has been seen, 859 (*Echium longifolium*). In the library at Geneva there is a fine original plate (no. 903 of the DeCandolle series) which bears Sessé & Mociño's original number, no. 293, and their original name, *Echium longiflorum*. This latter plant-number is cited with the published description of *Echium longiflorum*.

Macromeria longiflora Don

Lithospermum flavum S. & M. Fl. Mex. 32 (1893), ed. 2, 30 (1894). — Mountains between Zitacuaro and Malucatepec, Michoacan.

One specimen from Madrid has been seen, 1738 (*Lithospermum longiflorum*). There is a good plate at Geneva, no. 905, determined by Sessé

& Mociño as a species of *Philonomia*. DeCandolle has identified it with *Macromeria discolor* Benth. A specimen in the Boissier herbarium from Pavon was determined as *Lithospermum longiflorum* as was also Don's type of *Macromeria longiflora* at the British Museum. It should be noted that *M. longiflora* Don was formerly misunderstood and that, as has been shown, Contr. Gray Herb. 92: 93 (1930), it properly applies to the well-marked species later described as *M. discolor* Benth.

Macromeria viridiflora DC.

? *Lithospermum longiflorum* S. & M. Fl. Mex. 32 (1893), ed. 2, 29 (1894). — Santa Rosa near Guanajuato.

Only one specimen from Madrid has been seen, 5231 (*Lithospermum longiflorum*). There are two plates of the species at Geneva. Upon them DeCandolle founded his *M. viridiflora*. One is plate no. 904 of the folio series, and the other is plate 12, f. 1 of the volume of Sessé & Mociño's generic analyses. They were treated as members of the new genus *Philonomia* and associated with the specific name adopted by DeCandolle. The two plates and the specimen from Madrid are evidently conspecific with the plants subsequently treated as *Macromeria* (or *Onosmodium*) *Thurberi*. This latter species, however, is known only from southern Arizona and New Mexico and south along the northern Sierra Madre Occidental to southernmost Chihuahua. In the absence of modern collections from more southern localities it seems well to question old records attributing the species to central Mexico. Rickett, Chron. Bot. 11¹: 29 (1947), has given evidence that Mociño and his artist traversed the area in Chihuahua in which the species is well known. I am inclined to believe that they may have obtained it there.

ARNOLD ARBORETUM,
HARVARD UNIVERSITY.