

# NEW OR NOTEWORTHY PLANTS FROM COLOMBIA AND CENTRAL AMERICA—6.<sup>1</sup>

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## INTRODUCTION.

In this sixth contribution to the Colombian and Central American flora, further new species from recent collections made by myself and others are described and a few old types, hitherto imperfectly known, are redescribed. There is also proposed a new arrangement for a section of the genus *Combretum*.

## MORACEAE.

### TWO NEW SPECIES OF *COUSSAPOA*.

*Coussapoa brevipes* Pittier, sp. nov.

An epiphytic shrub; branchlets thick, subterete, glabrescent.

Leaves coriaceous, the petioles glabrous or minutely pubescent, 4 to 6 cm. long, the blades ovate, rounded at the base, obtuse or subacute at the apex, 10 to 17 cm. long, 6.5 to 11 cm. broad, the upper face glabrous, the lower face pulverulent-pubescent, whitish, the costa and veins impressed above, very prominent and evanescent-lanuginous beneath, the veins 12 to 14, running straight to the margins and there connected by a single nerve; venules very slender and inconspicuous; margin sinuate, the sinuses corresponding to the ends of the veins. Stipules obliquely triangular, acute, minutely woolly-pubescent outside, 7 cm. long, 3 cm. broad at the base, caducous.

Male inflorescence not known. Female inflorescences geminate in the upper axils; peduncles 0.5 to 1 cm. long, thick, simple, minutely woolly-pubescent; flower heads globose, about 0.6 cm. in diameter. Flowers surrounded by an involucre of delicate, membranous, palmatifid bractlets, much shorter than the perianth; perianth urceolate, obovoid, about 2 mm. long, abruptly and evenly contracted around the style, the upper exposed part brown-velvety, the lower immersed part glabrous and transparent. Ovary ovoid, glabrous; style short; stigma capitellate, papillose.

Type in the U. S. National Herbarium, no. 679541, collected on the hills of Sperdú, near Puerto Obaldía, San Blas Coast, Panama, growing on *Mimusops daniellensis* Pittier, in forest, female flowers only, September 5, 1911, by H. Pittier (no. 4386).

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<sup>1</sup> For no. 5 of this series and list of earlier issues see p. 143, this volume.



This species is characterized principally by the short-pedunculate female flower heads and the pulverulent indument of the lower face of the leaves.

***Coussapoa panamensis* Pittier, sp. nov.**

A tree; branchlets terete, glabrous, the younger parts sparsely covered with very short, white, appressed hairs.

Leaves coriaceous, the petioles minutely puberulous or glabrescent, 3.5 to 6.5 cm. long, the blades ovate, rounded at the base, acute or acuminate at the apex, 11 to 18 cm. long, 7.5 to 11 cm. broad, glabrous and more or less muriculate above, felted-canescens beneath; margin sinuate; venation subprominent on the upper face, very prominent on the lower face, the straight primary veins glabrescent or puberulous, anastomosed along the margin, the venules also glabrescent, dark and distinct on the whitish background. Stipules velvety without.

Male inflorescence not known. Female inflorescences single or geminate in the upper axils; peduncles terete, simple, 4 to 5 cm. long, thicker at the apex, minutely pubescent; flower heads depressed-globose, about 1.5 cm. long and 2 cm. in diameter; flowers bractless, densely congested; perianth tubular, thick, about 3 mm. long, minutely puberulous at the apex, the apical pore round; ovary obovoid; style very short; stigma papillose. Drupe ovoid, about 8 mm. long, densely appressed-hairy, surrounded by the loose, accrescent perianth.

Type in the U. S. National Herbarium, no. 678968, collected along Río Fató, Province of Colón, Panama, in forest, female flowers only, July 9, 1911, by H. Pittier (no. 3892).

By the unbranched peduncles of the female inflorescence, this species is related to the South American *C. fontanesiana*, *C. asperifolia*, *C. villosa*, and *C. martiana*, as well as to *C. brevipes* Pittier from the same region in Panama. It differs, however, from each one of them in some details, nor can it be readily identified with any of the other species of Central America. The Central American species of *Coussapoa* are in need of revision.

#### FOUR NEW SPECIES OF CECROPIA.

***Cecropia arachnoidea* Pittier, sp. nov.**

A tree 5 to 8 meters high, sparingly branched, the branchlets short, undivided, the younger parts densely ferruginous-villous.

Stipules ferruginous-pubescent, about 7 cm. long, the apex twisted into an acute tip. Leaves coriaceous; petioles plurisulcate, more or less ventricose at the base, 22 to 53 cm. long, at first ferruginous-pubescent, glabrescent later, the basal pulvinus brown-velvety; leaf blades 35 to 45 cm. in diameter, scabrous above, whitish-pubescent beneath with the very prominent, puberulous costæ and veins more or less sparsely covered with short white hairs; lobes 8 to 10, parted from one-half to two-thirds of the distance from the center to the apex, broad, obtuse, their margins entire; larger lobe 30 cm. long, 13.5 cm. broad; smallest lobe about 14 cm. long.

Inflorescences pedunculate, the peduncles geminate in the axils, flattened, covered with a minute ferruginous pubescence interspersed with sparse long, white hairs. Spathes white-arachnoid, not contracted at the base, cuspidate, about 5 cm. long. Male inflorescence: peduncles 8.5 cm. long, erect; aments 25 to 30 in the cluster, 2.5 to 4 cm. long, about 2.5 mm. in diameter, on pedicels 0.5 cm. long, villous; perianth tubular or urceolate, flattened at the apex, 1 to 1.2 mm. long, opening by an ovate pore; filaments of the stamens almost terete, the anthers oblong. Female inflorescence: peduncles 7 to 9.5 cm. long, pendulous; aments 3 to 5 together, sessile, 6 to 9 cm. long, nearly 1



cm. in diameter; perianth tubular, 2 to 2.5 mm. long, the upper exposed part flat, filmy-hairy, the pore round, very small; ovary ovate-lenticular, the style short and slender, the stigma capitate, penicillate.

Type in the U. S. National Herbarium, no. 479152, collected near Gamboa, Canal Zone, Panama, in flower, July 23, 1911, by H. Pittier (no. 4056).

Another collection was made at Culebra, Canal Zone, Panama, in flower, July 26, 1911 (*Pittier* 4060).

***Cecropia asperrima* Pittier, sp. nov.**

Leaves coriaceous; petioles 21 to 23 cm. long, 0.5 to 0.7 cm. thick at the base, glabrescent but at first grayish or fuliginous-tomentose; leaf blades peltate, 23 to 30 cm. in diameter, at first sparsely whitish-tomentose, later dark green and very rough above, white-tomentose beneath between the lightly ferruginous-tomentose veins; lobes 8 to 10, divided for more than half their length, the larger ones 15 to 20 cm. long, 6.5 to 9 cm. broad, the smaller ones 7.5 to 8 cm. long.

Inflorescences pedunculate, the peduncles more or less villous; spathes snowy arachnoid tomentose without. Male inflorescence: peduncles about 3.5 cm. long; aments about 25 in the cluster, slender, 3 to 4 cm. long, pedicellate, the pedicels villous, 0.5 cm. long; perianth glabrous, smooth, 2-lobulate. Female inflorescence: peduncles 4 to 8 cm. long; aments 4 or 5 together, sessile, 3 to 5 cm. long, about 0.8 cm. thick, the flowers united by a filmy white tomentum.

Type in the U. S. National Herbarium, no. 41703, collected in Nicaragua, precise locality not stated, by Charles Wright (U. S. North Pacific Exploring Expedition).

OTHER COLLECTIONS:

NICARAGUA: Chinandega, flowers, January 13, 1903, *C. F. Baker* 2007.

COSTA RICA: Nicoya, along roads, flowers, March, 1900, *Tonduz* (Inst. Fís. Geogr. Costa Rica, no. 13870). Llanos de Turúcares, common in hedges and thickets, flowers, June, 1902, *Pittier* (Inst. Fís. Geogr. Costa Rica, no. 16388).

The type specimen was labeled *C. obtusa* Trécul, but in that species the male aments are 12 to 15 together and about 10 cm. long, the perianth of the male flowers is hirtellous, the female aments are 8 to 9 cm. long and pedicellate, etc.

***Cecropia longipes* Pittier, sp. nov.**

A small tree, sparingly ramified; branchlets undivided, the younger parts densely grayish-hirtous.

Stipules broad, about 9 cm. long, acute, ferruginous, more or less thickly covered with white hairs. Leaves coriaceous; petioles multisulcate, appressed whitish pubescent, 35 to 55 cm. long, 1.2 to 1.4 cm. thick near the base, the pulvinus densely white-villous; leaf blades peltate, about 40 cm. in diameter, the upper face more or less densely covered with stiff, short, erect, white hairs, the lower face felted-canescens with the prominent venation mixed whitish and fuliginous-pubescent; lobes 9, broad, rounded, the sinuses hardly reaching one-third of the distance from center to apex of the blade, the margin entire; largest lobe about 29 cm. long and 15 cm. broad.

Inflorescence pedunculate, the peduncles geminate in the axils of the leaves, flattened, more or less densely whitish-villous. Spathes not known. Male inflorescence: peduncles about 10 cm. long; aments 50 to 60 together, 4 to 12 cm. long, 1 to 2 mm. thick, the clusters on slender hairy pedicels 1 cm. long; perianth tubular or turbinate, angulate, about 0.8 mm. long, the rounded apex thick and bilobate; staminal filaments short, broad and flat, the anthers ovoid. Female inflorescence: peduncles 65 to 70 cm. long; aments 6 in the cluster,



about 10 cm. long and 0.8 cm. thick, densely filmy-hairy, the pedicels (1 to 1.5 cm. long) and receptacle densely arachnoid-hairy; flowers all bound together with a filmy tissue; perianth tubular, about 2 mm. long, the upper part thick and brownish; apical pore very small; ovary ovoid-fusiform, attenuate at both ends; style very slender and short.

Type in the U. S. National Herbarium, no. 678897, collected around Tabernilla, Canal Zone, Panama, in old clearings, male flowers, July 6, 1911, by H. Pittler (no. 3823). The characters of the female inflorescence are drawn from Pittler 3825, from the same locality.

*Cecropia longipes* is distinguished by having the longest peduncles in both male and female inflorescences of all the Isthmian species of *Cecropia*. It seems to be closely related to *C. ruiziana*. The female peduncles are much longer than in any other hitherto described species.

***Cecropia maxonii* Pittler, sp. nov.**

A tree 10 to 12 meters high, branched above, the younger shoots arachnoid, faintly canescent.

Stipules brownish, sparsely covered with long appressed white hairs. Leaves coriaceous; petiole multisulcate, minutely puberulous, 15 to 25 cm. long, about 8 mm. thick, the pulvinus brown, at first densely grayish-villous; leaf blades peltate, about 25 cm. in diameter, glabrous or roughly muricate-glandular above, canescent between the prominent, pilosulous costæ and veins beneath, 10-lobate, the lobes parted for from one-half to three-fourths of the distance from center to apex, acuminate or obtuse, the margin entire-repand; large lobes 18 cm. long, 8 cm. broad; smaller lobes about 12 cm. long.

Male inflorescences pedunculate, the peduncles 2 or 3 together in the axils, 5 to 6 cm. long, thick, flattened, sparsely covered with minute white hairs. Spathe about 11.5 cm. long, contracted at the base, acute at the apex, dark-colored, very sparsely arachnoid-hairy. Aments 12 to 15 together, pedicellate, the pedicels glabrescent, 0.6 to 1 cm. long. Flowers small, waxy; perianth golden yellow, tubular or turbinate, angulate, 1.2 to 1.5 mm. long, the upper part thicker, glabrous and lustrous, bilobulate, the lobules ciliate, parted by a narrow slit; staminal filaments connate at the base, compressed-fusiform, glabrous; anthers pale yellow, one exserted at a time. Female inflorescence not known.

Type in the U. S. National Herbarium, no. 675493, collected in the vicinity of El Boquete, Chiriquí, Panama, at an altitude of 1,000 to 1,200 meters, male flowers only, March 2 to 8, 1911, by William R. Maxon (no. 5132).

This species is characterized by its very coarse and rather small leaves, as well as by the waxy appearance and yellow color of the male flowers. The whitish, glandlike excrescences of the upper face of the leaves may also be a constant and peculiar character.

## PROTEACEAE.

### THREE NEW SPECIES OF ROUPALA.

***Roupala darienensis* Pittler, sp. nov.**

A tree 20 to 30 meters high, the young branchlets more or less fulvous-hairy at the base and around the insertion of the leaves, the axillary buds rufous-hairy. Leaves subcoriaceous, flat, distichous, the petioles slender, flattened above, submarginate, 3.5 cm. long, densely rusty or rufous-hairy above, the blades broadly ovate (on adult trees) to narrowly elliptic (on shoots and seedlings), oblique or suboblique, ovate and abruptly attenuate or attenuate-cuneate at the base, short or long-acuminate at the apex, the acumen acute, 6 to 12 cm. long, 3 to 4.5 cm. broad, dark green and obscurely reticulate, the costa sub-



impressed, often pilosulous, and the (4 to 6) main veins prominulous above, glabrous, opaque, more or less rusty-colored, the costa and veins sharply prominent beneath; margin entire or remotely denticulate on the upper half of the blade. Floral rachis slender, about 15 cm. long, brownish-pubescent, axillary at the end of the branchlets; flowers not known. Follicles elliptic, compressed, stipitate, short-mucronate, minutely and sparsely pubescent; pedicel 4 mm., stipe about 7 mm. long; body of the follicle 2.8 to 3.2 cm. long, 1.2 cm. broad; remnant of the style not over 2 mm. long. Seeds (2 in each follicle) cordate, dark brown, minutely pilosulous, surrounded with a membranous, ovate-elliptic, pinkish wing, the whole 2.7 to 2.9 cm. long, about 1 cm. broad.

Type in the U. S. National Herbarium, no. 678256, collected at Cana, southern Darién, Panama, fruits, April to June, 1908, by R. S. Williams (no. 739).

Collected also on the banks of Pirre River, southern Darién, Panama, young shoot only, June, 1914, by H. Pittier (no. 6975).

*Roupala darienensis* is closely related to a plant of Santa Marta, determined as *R. gardneri* (but certainly not Meisner's species), and to *R. panamensis*. It differs from both in pubescence, length of the spikes, and leaf characters, and from the latter in the large size of the adult tree. See notes under *Roupala panamensis* below.

***Roupala glaberrima* Pittier, sp. nov.**

A tree, entirely glabrous. Leaves entire, thick, flat, coriaceous, the petioles slightly flattened, 2.5 to 3 cm. long, the blades ovate-elliptic, cuneate-attenuate at the base, obtusely acuminate at the apex, 4.5 to 7 cm. long, 2 to 4 cm. broad, lustrous and reticulate above, the costa, veins, and venules slightly prominent, opaque, the costa and veins hardly visible beneath; margins more or less revolute. Racemes axillary or subterminal, the rachis rather thick, 10 to 21 cm. long; flowers numerous; pedicels single or geminate, when the latter free to the base, about 4 mm. long; sepals linear-oblong, rounded at the apex, 12.5 mm. long, 1.3 mm. broad at the broadest place near the apex, the upper margins inflexed (involute), with a beaked mucro at the apex; stamens inserted on the upper half of the sepals, the filaments very short (0.2 to 0.5 mm. long), the anthers linear-oblong, 2.5 to 3.5 mm. long; disc scales 4, ovate, nearly 0.5 mm. long; pistil 11.5 mm. long, the ovary ovoid-oblong, the style clavate and sulcate at the upper part, with a truncate apex.

Type in the U. S. National Herbarium, no. 579863, collected along the Ciruelas River above Barba, Costa Rica, flowers, March 15, 1890, by A. Tonduz (Inst. Fís. Geogr. Costa Rica, no. 2228).

While in Costa Rica, I identified this specimen, with doubt, as *R. nitida* Rudge, a species of French Guiana, but I now find that it differs from that in the texture and size of the leaves, the proportional length of these and the racemes, the dimensions of the sepals, etc. From *R. loranthoides* Klotzsch, of Guatemala, which, also, is said to be entirely glabrous, it departs in the larger flowers, the shape of the disc scales, and other minor details.

***Roupala panamensis* Pittier, sp. nov.**

A small tree, the young branchlets glabrous or glabrescent. Leaves coriaceous, flat, the petioles 2 to 5 cm. long, thicker at the base, narrowly marginate, flattened above, hairy on the upper side at the base, sparsely scaly, the blades ovate to elliptic, rounded-cuneate and decurrent at the base, long and acutely acuminate at the apex, 6.5 to 11 cm. long, 2.5 to 5 cm. broad, glabrous on both sides, pale green above, paler, minutely punctulate, and reticulate beneath, the main veins (7 or 8) prominent above, the costa, veins, and venules prominent beneath; margins entire on the lower half of the blade, remotely sinuate-toothed or serrate on the upper half. Floral spikes axillary or on defoliate



nodes of the old wood, the rachis slender, suberect, cano-pubescent, 8 to 10 cm. long; flowers numerous, white, geminate, each pair subtended by a minute, ovate, scarious bract covered with red hairs; pedicels free, cano-pubescent, 1.5 to 2 mm. long; sepals linear, 3-nerved, 7.5 mm. long, broader and rounded at the base, truncate at the apex, minutely and sparsely pubescent without; stamens inserted on upper half of the sepals (4.5 mm. from base), glabrous, the filaments 0.5 to 0.6 mm. long, the anthers linear or oblong-linear, 3 mm. long; disc scales ovate or suborbicular, 0.5 to 0.6 mm. high; pistil 8 mm. long, the ovary ovoid, whitish-tomentellous, the style glabrous, clavate, 2-sulcate.

Type in the U. S. National Herbarium, no. 676779, collected between El Corozal and Ancón, Canal Zone, Panama, in a swamp, flowers, February 2, 1911, by H. Pittier (no. 2630).

Owing to the incompleteness of the descriptions of the known species of *Roupala*, it is very difficult to establish the relationship between the many members of the genus. The one just described belongs undoubtedly to the group designated by Meisner<sup>1</sup> as section 2: "*Foliis dentatis vel passim integerrimis*;" but it does not correspond to any of the descriptions under that head, being characterized by the cano-pubescent pedicels and rachis of the inflorescence, the white tomentellum of the ovary, the small reddish bract at the base of the pedicels, the hairiness at the base of the petioles, etc. It is apparently very closely related to a plant of Santa Marta (*H. H. Smith* 1913, 1914), distributed under the names of *R. gardneri* Meisn. (?) and *R. gardneri dentata* DC.,<sup>2</sup> but in that the branchlets are stouter, the floral spikes either axillary at the ends of short branchlets or forming large, terminal, branched panicles. The petioles and the length and texture of the leaves are also distinct and the flowers not so slender and perhaps longer than in the Panama species. It is very doubtful whether the Santa Marta plant is the true *R. gardneri*; as stated under *R. darienensis*, I do not think it is. When the range of variation in the specific characters within this genus is better known, it is quite possible that forms that are kept apart for the present may be brought together under one name.

#### AN IMPERFECTLY KNOWN SPECIES OF EMBOTHRIUM.

*Embothrium ruizii* (Klotzsch) Pittier.

*Oreocallis ruizii* Klotzsch, *Linnaea* 20: 474. 1847.

A bushy shrub, the branchlets at first grayish, rusty, or fulvous-tomentellous, glabrous later. Leaves subcoriaceous, bunched at the ends of the branchlets, the petioles grayish-tomentellous, 2 to 2.5 cm. long, the blades oblong, attenuate at the base, rounded-emarginate at the apex, 5 to 9 cm. long, 2 to 4 cm. broad, glabrous and subreticulate above with the costa and veins prominulous, glaucous, sparsely pubescent, and reticulate beneath, the venation brownish, the costa prominent and subtomentellous. Inflorescence spicate, terminal, the rachis thick, brownish-tomentellous, about 4.5 cm. long; flowers numerous, glabrous, whitish or pale greenish white; basal bract acute-triangular, hairy, about 3 mm. long; pedicels thick, about 1 cm. long; perianth about 3.5 cm. long, forming at the apex a 4-lobate head; anthers sessile, subacute, about 2 mm. long and broad, inserted inside of the concave lobes of the perianth; disc lamella brownish, fleshy, half surrounding the base of the pistil; pistil about 4.7 cm. long, the ovary stipitate, hardly thicker than the style, 1-celled, the ovules few,

<sup>1</sup> In DC. *Prodr.* 14: 427. 1856-57.

<sup>2</sup> Not De Candolle but Meisner is the author of this name.



with a long funicle, the style curved, the stigma large, umbonate, discoid-oblong, with revolute margins. Follicle woody, glabrous, subglaucous within, ovoid-fusiform, long-stipitate, bearing at the apex the thick, persistent style; dehiscence unilateral; pedicel and stipe each about 1 cm. long; body of the follicle 4 cm. long and 2 cm. in diameter; persistent style about 3 cm. long. Seeds 4 in each follicle, obovate, flat, whitish, 2 to 2.5 cm. long, about 1 cm. broad, including the terminal, membranous, ovate-elongate wing.

Collected at Cariamanga, Ecuador, at an altitude of about 2,400 meters, November 24, 1910, by Dr. C. H. T. Townsend.

Two species of *Embothrium* Forst., section *Oreocallis* R. Br., have been reported from the Ecuadorean Andes, *E. grandiflorum* Lam. and *E. ruizii*. Dr. Townsend's specimens agree fairly with the description of the latter species, which is here emended and supplemented by the description of the fruit and seed.

## CAESALPINIACEAE.

### TWO NEW SPECIES OF SCHIZOLOBIUM.

*Schizolobium covilleum* Pittier, sp. nov.

A large, deciduous tree, 25 to 30 meters high, the trunk over 1 meter in diameter. Larger limbs horizontal; crown rounded-depressed. Bark grayish and shaggy on the trunk, brownish and covered with minute lenticels on the branchlets. Heart wood yellow, fine-grained and hard. Younger shoots densely covered with a brown downy pubescence.

Leaves bipinnate, the mature ones (not collected) often very large, the young ones on floriferous branchlets 10 to 20 cm. long. Rachis ferruginous-pubescent or puberulous, the petiolar part of the primary costa 1.5 to 2 cm. long. Pinnæ 15 to 21, opposite or alternate, 19 to 29-folliolate, up to 8 cm. long. Leaflets sessile, alternate, 5 to 10 mm. long, 4 to 5 mm. broad, suborbicular to ovate-elliptic or obovate, obliquely truncate at the base and strongly inequilateral, the insertion being at the lower angle, rounded and often subemarginate or sometimes subacute at the tip, glabrous or sparsely hairy and reticulate above, paler and more or less pubescent beneath. Stipules oblong, rounded at the apex, about 6 mm. long, scarious, ferruginous-hairy, very caducous.

Floral racemes unbranched, 15 to 25 cm. long, axillary and terminal and forming broad panicles at the ends of the branchlets, the rachis, pedicels, and calyx densely ferruginous-pubescent. Bracts and bractlets oblanceolate, 5 to 7 mm. long, ferruginous-hairy, early deciduous. Pedicels slender, 7 to 20 mm. long. Calyx tube broadly cupulate, scarcely oblique; calyx lobes 5, ovate-elliptic, narrowing more or less toward the rounded tip, about 8 mm. long and 5 mm. broad. Petals 5, yellow, unguiculate, suborbicular, 14 mm. long, 12 mm. broad, sparsely dark-dotted toward the middle; claw 2.5 mm. long, glandular-hairy above near the base of the limb, pubescent near the insertion on the receptacle. Stamens 10, nearly 12 mm. long, the filaments densely hairy on the lower half, sparsely glandular-hairy on the upper half, the anthers ovate, about 2 mm. long. Pistil 15 mm. long, densely whitish-pubescent for the lower two-thirds of its length, gradually glabrescent toward the tip; ovary sessile, short, few-ovulate, attenuate into a long style; stigma obtuse and small.

Legume obovate-oblique, long-attenuate, stipitate, about 9.5 cm. long and 3.2 cm. broad, 1-seeded, the valves coriaceous, glabrous and smooth without, strongly reticulate within. Seed ovate, strongly compressed, 2.3 cm. long, 1.5 cm. broad.

Type in the U. S. National Herbarium, no. 715287, collected along a dry river in the neighborhood of Pocrí, near Aguadulce, Province of Coclé, Panama, at



about 40 meters above sea level, flowers, December 9, 1911, by H. Pittier (no. 5105).

OTHER COLLECTIONS:

PANAMA: Near Empire, Canal Zone, *Hayes* 584. Río Abajo, on the road between Las Sabanas and Old Panama, flowers, January, 1915, *Pittier* 6916. Quebrada Honda, near Pinogana, southern Darién, fruits, April, 1914, *Pittier* 7003.

Bentham<sup>1</sup> considered this species very similar to *Schizolobium excelsum* Vog., but questioned its standing on account of the absence of fruit. The characters of the leaves and flowers are quite sufficient, however, to show that the Panama tree belongs to a distinct species. Its racemes are shorter, the flowers a little smaller, the petals broader, glabrous, and marked with numerous dots between the delicate brown veins; the claw is not only pubescent, but covered on its upper part with short, stiff, glandular hairs; the filaments are covered with the same kind of indument; and the pubescence on the pistil is not dark brown ("atro-fusca") but quite white. In *Schizolobium excelsum* the inflorescences and leaves are much larger, the pinnæ are all opposite, and the leaflets are larger, much less oblique, and petiolulate.

Named for Mr. Frederick V. Coville, Curator of the United States National Herbarium, whose constant interest in floristic investigations has contributed immensely to the success of the botanical survey of Panama.

***Schizolobium kellermanii* Pittier, sp. nov.**

A large tree.

Leaves bipinnate, the main costa thick, angular, about 25 cm. long, glabrescent, the petiolar part 7.5 cm. long; pinnæ 20, paired and inserted side by side on the upper part of the main costa, the rachis 15 to 20 cm. long, slender, with a thick base, more or less angular, subcanaliculate and hairy on the upper side, elsewhere glabrescent; leaflets 32 to 42, inserted in pairs side by side on the upper side of the rachis, short-petiolulate; petiolules terete, 1 to 1.5 mm. long, canescent; leaflet blades oblong, rounded at both ends, mucronulate at the apex, 2 to 3 cm. long, 7 to 9 mm. broad, glabrous, dark green and subreticulate above, paler and appressed-pubescent beneath. Stipules not seen.

Floral racemes simple, about 35 cm. long or over, the rachis thick, angular, glabrescent or sparsely puberulous, the peduncular part terete, about 6 cm. long. Bracts and bractlets absent. Pedicels slender, glabrous, about 6.5 mm. long. Calyx tube turbinate, oblique, narrow, costulate, dark brown hairy, the 5 lobes reflexed, ovate-oblong, subacute, 10 mm. long, 4 mm. broad, sparsely brown-hairy without. Petals 5, obovate-oblong or spatulate, attenuate into a narrow claw at the base, rounded-obtuse at the apex, more or less oblique, 1.8 cm. long, 7 to 9 mm. broad, entirely glabrous. Stamens 10, the filaments, about the length of the petals, more or less tomentellous-pubescent at the base. Pistil about 2 cm. long, the ovary sessile, oblong, compressed, arcuate, densely brown-hairy, 7-ovulate, attenuate into a long, glabrous style.

Pod (immature) obovate, slightly oblique, long-attenuate and bearing the persistent calyx tube at the base, rounded-obtuse at the apex, about 11.5 cm. long, 3 cm. broad, entirely glabrous, the pedicel 1.2 cm. long.

Type in the U. S. National Herbarium, no. 578657, collected at San Felipe, Department of Retalhuleu, Pacific coast of Guatemala, flowers and young fruits, February 4, 1906, by W. A. Kellerman (no. 5566).

This new type, through which the area of distribution of the genus is extended far beyond its previously known limits, is closer systematically to

<sup>1</sup> In Mart. Fl. Bras. 15<sup>2</sup>: 75. 1870.



*Schizolobium excelsum* Vog. than to *S. covilleianum* Pittier, differing from the former probably in the number of the pinnæ and leaflets, in the shape and pubescence of the latter and the pubescence of the rachis of the pinnæ, in the shorter pedicels, and in the longer calyx lobes, smaller petals, etc. An immature specimen collected in the semiarid district of the Atlantic coast of Guatemala (Chiquimula and Alta Verapaz) by Sereno Watson (no. 248) probably belongs to the same species.

Named in honor of the collector, the lamented Prof. W. A. Kellerman, who lost his life in the course of his botanical survey of Guatemala.

#### A LITTLE KNOWN SPECIES OF MACROLOBIUM.

*Macrolobium floridum* Karst. Fl. Columb. 1: 151. pl. 75. 1861.

A middle-sized tree, 20 to 25 meters high, with smooth grayish bark, irregular branching, and elongate crown.

Leaves alternate, paripinnate, always 2-foliolate, glabrous. Stipules acicular, 8 to 12 mm. long, glabrous and caducous; stipels smaller. Petiole 6 mm. long, very thick. Leaflets subsessile, obovate-lanceolate, oblique, with the narrow side within, the broad exterior side rounded at the base, acute at the apex, 25 to 35 cm. long, 9 to 11 cm. broad, light green above, paler beneath; nervation prominent beneath, with alternate veins anastomosed along the margin.

Inflorescence racemose, 12 to 16-flowered, borne either on the trunks and limbs or at the ends of the branchlets. Peduncles 3 to 4 cm. long, thick, covered with a few small triangular acute bracts. Flowers pedicellate, about 6 cm. long, with a small bract at the base. Pedicels 8 to 10 mm. long, bearing at the tip 2 obovate bractlets, these about 12 mm. long, more or less connate at the base, rounded at the tip, entirely glabrous. Calyx tube short-stipitate, 1 cm. long, callous and hairy inside at the throat; sepals 4, imbricate, ovate-elliptic, slightly attenuate at the base, rounded at the tip, about 2 cm. long and 6 mm. broad, entirely glabrous. Petal single, unguiculate, elliptic-lanceolate, twice as long as the sepals (7 mm. long, claw included), about 12 mm. broad, crispate and irregular on the margin, very caducous, pinkish white (turning to yellowish brown by desiccation). Stamens 3, equal to or a little longer than the petal; filaments thick at the base, subulate at the tip; anthers ovate, versatile, minutely papillose on the upper face. Pistil 4.7 to 5 cm. long; ovary stipitate, minutely pubescent on the sutural margins; ovules 5; style sparsely pubescent at the base, very long, arcuate, terete; stigma rounded-capitellate, papillose.

Legume 12 to 16 cm. long, 4.5 to 5 cm. broad, ligneous, short-stipitate, obtusely apiculate, dehiscent; upper suture broad and slightly canaliculate; valves twisted after dehiscence as in *Brownea*. Seeds 4 or 5, ovate, flat, about 3.5 cm. long and 2.5 cm. broad.

Type from mountains near Puerto Cabello, Venezuela.

Again collected on the plain of Sperdî, near Puerto Obaldia, San Blas Coast, Panama, near sea level, flowers and fruit, September 3, 1911, by H. Pittier (no. 4355).

Our specimens differ from the original description in their smaller inflorescences and somewhat longer pedicels, and in the form of the bractlets, the more or less complete absence of hairs, and a few minor details, but the agreement is so perfect in all other particulars that there is little room for doubt as to the identity of our specimens with the Venezuelan species described by Karsten.



## FABACEAE.

## NEW OR IMPERFECTLY KNOWN SPECIES OF SEVERAL GENERA.

*Sweetia panamensis* Benth. Journ. Linn. Soc. Bot. 8: 263. 1865.

A middle-sized tree with rounded crown.

Leaves alternate, imparipinnate; rachis, petiolules, and main nerve of the leaflets minutely hairy, the rachis slender, canaliculate, 6 to 12 cm. long; leaflets 7 to 13, opposite or subopposite, petiolulate, very caducous; petiolules 3 mm. long, terete; leaflet blades ovate-lanceolate, broadly cuneate at the base, rounded and emarginate at the broad tip, 2.5 to 5 cm. long, 1.7 to 2.5 cm. broad, inequilateral, coriaceous, dark green and lustrous above, pale beneath. Stipules very caducous or absent.

Inflorescence consisting of branched panicles in the axils of the terminal leaves. Rachises minutely pilose, the primary one 8 to 14 cm. long, the secondary ones successively shorter, 5 to 2 cm. long. Flowers numerous, pedicellate; pedicels 3 mm. long, pubescent, provided with 2 opposite, acicular, hairy, persistent bractlets about 11 mm. long; calyx persistent, about 3 mm. long, pubescent without, divided to the middle into 5 acute lobes; petals 5, spatulate, long-unguiculate, the blade suborbicular, slightly emarginate at the tip, the anterior one smaller (3.5 to 4 mm. long) with reduced blade, the 4 remaining more or less equal, about 6.4 mm. long and 3 mm. broad. Stamens 10, almost equal, quite glabrous, about 6 mm. long; anthers ovoid, dorsifixed, longitudinally dehiscent. Pistil glabrous, stipitate, oblique, about 8 mm. long; ovary 3-ovulate; style attenuate to an undivided acumen, persistent.

Legumes 1 or 2 to each spikelet, 5 to 7.5 cm. long by 1.5 cm. broad, 1 or 2-seeded, elliptic-lanceolate, quite flat, narrowing toward the base into a slender stipe, pedicellate, the pedicel as in the flower. Seeds small, ovoid, slightly depressed, reddish brown, with a black line on the edge below the hilum, about 6 mm. long by 5 mm. broad and 3 mm. thick; hilum small, ovate.

Type in the Kew Herbarium.

## COLLECTIONS:

PANAMA: Near Paraíso, Canal Zone, in woods, *Sutton Hayes* 267, type.

Experiment Station at Matías Hernández, near Old Panama, flowers, September 20, 1914, fruits, October, 1914, *Pittier* 6793. Also reported from southern Darién.

Notwithstanding the vagueness of Bentham's description, the identity of his *S. panamensis* with our specimens is quite evident. The tree is known in Panama under the name of "malvecino."

*Platypodium maxonianum* Pittier, sp. nov.

A tree 20 to 25 meters high. Trunk usually straight, 12 to 15 meters high, and up to 1.2 meters in diameter at the base; bark grayish, more or less rimose and shaggy.

Leaves alternate, with 10 to 20 leaflets. Rachis 10 to 20 cm. long, slender, thickened at the base, broadly canaliculate above, more or less pubescent, the petiolar portion 1.5 to 2 cm. long. Leaflets subcoriaceous, very oblique, the terminal one sometimes replaced by a setulose appendage 7 to 9 mm. long; petiolules 1 to 2 mm. long, terete, blackish, sparsely pubescent; leaflet blades elliptic-oblong, subcuneate at the base, rounded, emarginate, and mucronulate at the apex, light green, lustrous and more or less pubescent along the midvein above, paler and pubescent near the base and along the midvein beneath, 3 to 6 cm. long, 1.5 to 2 cm. broad, the smaller leaflets at the base of the leaf; veins



slender and prominent on both sides of the blade, finely reticulate beneath; margin entire. Stipules and stipels very caducous and not seen.

Flowers unknown.

Legume glabrous, samara-like, oblanceolate, stipitate, 11 to 11.5 cm. long, about 2.5 cm. broad, the basal part flat and membranous, the apex, bearing the seed, thicker, woody, rounded and apiculate; peduncle 2 cm. long; stipe 12 mm. Seed obovate, elongate, about 18 mm. long and 8 mm. broad, the hilum near the narrower end.

Type in the U. S. National Herbarium, no. 715433, collected in forests around San Felix, eastern Chiriquí, Panama, at about 100 meters above sea level, fruits, December 19, 1911, by H. Pittier (no. 5229).

This is very likely the species previously collected by Hayes between Gorgona and Matachín and reported in the *Biologia Centrali-Americana*<sup>1</sup> under the name of *P. elegans* Vog. The Panama species differs from the latter, however, in its larger leaves and leaflets and in its legume, which is about twice as long, with the venation distinct and the pointed apex more prominent. The pubescence is also less, and the study of the flower will probably bring to light other differential characters.

Named in honor of Mr. William R. Maxon, Associate Curator of the United States National Herbarium.

***Andira chiricana* Pittier, sp. nov.**

A medium-sized tree, with an oblong crown.

Leaves 9 to 11-folliolate, coriaceous; rachis slender, sparsely grayish-hairy, 18 to 22 cm. long; leaflets petiolulate. Petiolules minutely brownish-pubescent, 5 mm. long; leaflet blades elliptic, rounded or subcuneate at the base, acuminate at the tip, glabrous above, minutely tomentose and paler beneath, 3 to 8 cm. long, 1.5 to 3.5 cm. broad, the largest leaflets terminal. Stipules subulate, hairy, caducous, 6 to 7 mm. long; stipels stiff, glabrous, not over 2 mm. long.

Panicles terminal, erect, densely flowered, twice branched, the rachis minutely brownish or grayish-pubescent; bracts like the stipules; bractlets linear, 1 to 2 mm. long, very hairy, fugacious. Flowers 14 to 15 mm. long, including the short (1 mm.) hairy pedicel. Calyx campanulate, acute at the base, densely brownish-pubescent, about 5 mm. long, the anterior tooth rounded, the 4 posterior ones acute. Petal glabrous, pinkish purple; standard obovate, attenuate at the base, emarginate, subauriculate on one side (the left side, looking at the flower from the back), short-unguiculate, the total length 12 mm., the breadth 11 mm., the claw about 2 mm. long; wings 2-auriculate or subcordate at the base, almost straight, rounded at the tip, the claw 3.5 mm. long, the blade 8.8 mm. long and 4 mm. broad; carina 11.5 mm. long, 4 mm. broad, falcate and obtuse at the tip, the petals auriculate, the claw 4 mm. long. Stamens diadelphous. Ovary stipitate, grayish-hairy throughout, 2-ovulate, the style with a few long stray hairs.

Legume not known.

Type in the U. S. National Herbarium, no. 677755, collected near David, Chiriquí, Panama, flowers, March 28, 1911, by H. Pittier (no. 3372).

*Andira chiricana* is the only known Central American species of the genus having the ovary villous all over. The other species of its group are Brazilian. It seems closely related to *A. fraxinifolia* Benth., but differs in having the ovary 2-ovulate and hairy from the base, the stipules and bracts subulate, and the leaves coriaceous.

<sup>1</sup> Bot. 1: 316. 1880.



**Coumarouna panamensis** Pittier, sp. nov.

Section *Euoumarouna*. A portly tree, often reaching 50 meters in height and 1 meter in diameter at the base. Crown rounded. Bark brownish, slightly scaly. Twigs densely lenticellate.

Leaves alternate, glabrous, 5 to 8-foliolate. Petiole 40 to 70 cm. long, flattened above, 6 to 10 mm. broad at the base, closely reflexed-winged on both sides through its whole length, with a median ridge on the upper face from the first leaflets to the end; lower, rounded side densely lenticellate. First pair of leaflets opposite, the others alternate and more spaced along the middle part of the main rachis. Leaflets petiolulate, strongly inequilateral or dimidiate, discolored, densely covered with transparent dots; petiolules 10 to 15 mm. long, sharp-edged on the lower side; leaflet blades elliptic, oblique, 15 to 30 cm. long, 5 to 7 cm. broad (the narrow side equal to about one-third of the whole breadth), subacute at the base, subobtuse at the tip; nervation salient beneath with the costa acutely carinate. Stipules very caducous; stipels lanceolate, 4 to 7 mm. long.

Panicles terminal, loosely branching, 30 to 40 cm. long. Rachis more or less pubescent. Flowers large, pink, pedicellate. Pedicels 4 to 5 mm. long, minutely pubescent. Bracts and bractlets very small, hairy, deciduous. Calyx tubular, attenuate at the base, pubescent, the tube about 6 mm. long, the two anterior lobules 16 to 17 mm. long, 7 mm. broad, glandular-dotted, the three posterior acute and small (the middle one larger, about 1 mm. long). Vexillum suborbicular or ovate, hardly as long as the anterior calyx lobes, bilobate at tip. Wings obovate-oblique, about 16 mm. long, 6.5 mm. broad; the inferior lobe shorter and overlapping the superior one; claw slender, 1.5 mm. long. Petals of the keel free, about 19 mm. long and 6.5 mm. broad, minutely ciliate on the carinal margin, auriculate at the base. Stamens almost equal, all connate nearly to the tip; anthers ovate, short-apiculate. Ovary glabrous, uniovulate.

Fruit flat, elliptic, 6 cm. long, 3.5 cm. broad, and 3 cm. thick or less, pedicellate, rounded and obscurely apiculate at tip, hairy outside in the fresh condition, chocolate-brown and glabrous when dry, the transverse section of the interior cavity subcircular. Pedicel about 1.5 cm. long, thick. Seed almond-like, straight, elongate-oblong, and compressed, 5 cm. long, 1.3 cm. broad, with a light brown episperm.

Type in the U. S. National Herbarium, no. 679031, collected at Ballamonos, between Mamei and San Pablo, Canal Zone, Panama, on a hillside, flowers, July 12, 1911, by E. D. Christopherson (Pittier, no. 3950).

**OTHER COLLECTIONS:**

PANAMA: Along the Trinidad River, Canal Zone, near sea level, flowers, July 19, 1911, *Pittier* 4033. Forests of Pauarandó, Sambú Valley, southern Darién, fruits, February 8, 1912, *Pittier* 5727.

*Coumarouna panamensis* is nearly related to *C. oleifera* (Benth.) Taub., of the Mosquito Coast, a species imperfectly described. It has the same large, glandular calycinal wings, but differs in the shape of the vexillum and wings, in the longer and more rounded fruits, and in the size and shape of the seeds. The leaves of the latter species have not been described.

The fresh fruits of *C. panamensis* are covered with a grayish green pubescence and impregnated with an oily, sweet-smelling fluid, which may have its origin in the resinous channels that crowd the mesocarp. When the fruits are dry, these ducts are seen filled with a crystalline substance.



## VOCHYSIACEAE.

## A SPECIES OF VOCHYSIA REDESCRIBED.

*Vochysia ferruginea* Mart. Nov. Gen. & Sp. 1:151. pl. 92. 1824.

A tree, varying in height from 10 to 35 meters, and the trunk in diameter from 30 to 80 cm. Trunk straight, 7 to 15 meters from base to first branching, covered with a grayish, rather smooth bark. Branches ascending, forming a spreading crown. Branchlets angular-furrowed, covered with a brown, downy indument.

Leaves opposite, more or less coriaceous, yellowish green, smooth and almost shining above, the petioles and venation of the under face covered with a more or less dense, brown or golden brown pubescence. Petioles 5 to 8 mm. long, canaliculate. Lamina 7 to 12 cm. long, 3 to 5 cm. broad, ovate, ovate-elliptic, or elliptic-lanceolate, acute or subacute at the base, more or less abruptly narrowed at the tip into a long (1 cm.) mucronate acumen; costa thick, very prominent beneath, marked above by a deep furrow; primary veins 14 to 18, parallel, arcuately anastomosed near the margin, prominent beneath and slightly furrowed above; margin entire, revolute. Stipules 1 to 2 mm. long, hairy, subtriangular or subulate.

Inflorescence terminal, erect, simple or branching, the floral branchlets in the latter case axillary and foliate at the base. Rachis, peduncles, and pedicels more or less brownish-tomentose. Individual spikes usually densely flowered, 10 to 15 cm. long. Clusters 1 to 5-flowered, borne on a peduncle 2 to 4.5 mm. long. Pedicels very slender, 4 to 5 mm. long. Bracts very small (1.5 to 2 mm. long), lanceolate-subulate, hairy, caducous. Calyx reddish orange, the interior sepal cucullate, 7.5 mm. long, sparsely pubescent at the base, 3 mm. broad, with a strongly arcuate spur 8 to 9 mm. long, the 4 posterior sepals orbicular and subacute, sparsely ciliate, about 1.5 mm. long and broad, but the two middle ones a little larger. Petals light yellow, oblong-spatulate, more or less tomentose outside at the tip and along the middle part, the middle one about 9.5 mm. long and 3.5 mm. broad, cucullate, the lateral ones spreading, rounded at the tip, 9 to 9.5 mm. long, 2.5 mm. broad. Staminodes small, ligulate, about 1 mm. long. Stamen about 7 mm. long; filament slender, sparsely hairy, about 1.5 mm. long; anther basifixed, naviculiform. Pistil glabrous, 6.5 mm. long; ovary trigonous.

Capsules 2.5 cm. long, dark brown and verruculose outside, hanging from single peduncles 1 to 1.5 cm. long. Total length of achene 24 mm. and of seed 11 mm., the latter pale brown, covered with downy, darker hair.

Type from Brazil.

## OTHER COLLECTIONS:

PANAMA: In forests between Panama and Cruces and in the Island of Coyba, *Seemann*. Near Panama, in forests, flowers, April, *Hayes*. Black Swamp near Lion Hill, Canal Zone, flowers, June 5, 1911, *Christopherson* (Pittier, no. 3790). Between Panama and El Corozal, Canal Zone, flowers, September, 1911, *Pittier* 4442. Near San Felix, eastern Chiriquí, on the outskirts of savannas, fruit, December, 1911, *Pittier* 5743.

Seemann identified this species with *V. tomentosa* DC., from which it seems to differ in several well-marked details, such as the smaller stipules, larger leaves, more developed inflorescences, etc. The above description agrees more closely with that of *V. ferruginea* Mart., as given by Warming, who likened to this Brazilian species the specimens collected at Panama by Hayes. The main difference is that the flowers of the Panaman form, as collected by Mr. Chris-



topherson and myself, are sensibly larger; on the other hand, no. 3790, collected in the swamps of the Gatún Basin, now under water, is distinguished in several ways from nos. 4442 and 5743, coming from the dry Pacific slope, and we must assume that there is in this species a rather ample varietal range.

The flowers of *Vochysia ferruginea*, which are very showy, possess a strong scent, which is very like that of the violet.

## OCHNACEAE.

### A SPECIES OF CESPEDESIA REDESCRIBED.

*Cespedesia macrophylla* Seem. Bot. Voy. Herald 97. 1853.

A tree, about 20 meters high and up to 60 cm. in diameter at the base, low-branching, the limbs long, ascending, the crown umbraculiform.

Leaves clustered at the ends of the thick branchlets, alternate, glabrous, coriaceous, intermixed with numerous stipules; petioles angular, thick, dilated at the base, flattened above and marginate, 2 to 3.5 cm. long; leaf blades obovate-spatulate, narrowing to the base, truncate-obtuse at the apex, 25 to 70 cm. long, 10 to 24 cm. broad, the costa and veins prominent on both sides, the latter numerous and parallel, the margin mucronate-dentate; stipules linear, 4 to 6 cm. long, 6 to 8 mm. broad, obtuse or subacute, glabrous.

Inflorescences terminal, paniculate, erect, 5 to 140 cm. long, glabrous, the branchlets ascending-divaricate; flowers generally 2 together on a common peduncle, this short and thick; pedicels slender, 1 to 1.5 cm. long; sepals 5, ovate, obtuse, about 3 mm. long, brown, coriaceous, persistent; petals 5, obovate, obtuse, 18 mm. long, 10 to 11 mm. broad, bright yellow, caducous; stamens numerous, the filaments shorter than the petals, inflexed, thickened toward the apex, apiculate; anthers basifixed, linear, opening by terminal pores; ovary stipitate, 5-celled, the ovules numerous; style very short, obscurely 5-lobed at the apex.

Capsule not known.

Type in the Kew Herbarium, collected at Utria Bay, Darién, Colombia, by Seemann.

Again collected on hills back of Puerto Obaldía, San Blas Coast, Panama, flowers, September 3, 1911, by H. Pittier (no. 4340).

A gregarious tree, growing on the hillsides and presenting a gorgeous aspect at the time of blossoming. The leaves and inflorescences, all massed at the ends of the stout branchlets, are enormous, and under this heavy crown the bare skeleton of the tree has an awkward appearance.

## COMBRETACEAE.

### TWO NEW SPECIES OF TERMINALIA.

*Terminalia chiriquensis* Pittier, sp. nov.

A tree 25 to 30 meters high, the trunk straight, the bark brownish, smooth, slightly scaly, the crown elongate, the young branchlets fistulose, green, minutely pubescent. Leaves alternate, membranous, eglandular, the petioles canaliculate, more or less rusty-pubescent above, 0.6 to 1 cm. long, the blades ovate-elliptic, long cuneate attenuate at the base, acuminate at the apex, 8 to 14 cm. long, 3 to 5.5 cm. broad, sparsely punctulate and pubescent or glabrous above, reticulate and more or less barbellate along the costa beneath. Floral spikes alternate along the young shoots, 5 to 12 cm. long, subpendulous, many-flowered, the rachis slender, minutely pubescent; flowers greenish yellow, sessile; calyx sessile on the ovary, 0.8 to 1 mm. long, cupuliform, 5-lobulate, minutely pubescent without, villous-tomentose within, the limb 0.8 to 1 mm. long, the lobes reflexed, subobtuse, about 0.7 mm. long; stamens 10, glabrous, the filaments



reflexed at the apex, about 3.5 mm. long, the anthers cordate; disc annular, pulvinate, densely hairy; ovary ovoid-oblong, about 2.5 mm. long, substipitate, smooth, minutely ferruginous-pubescent; style thick, shorter than the stamens, hairy except at the apex.

Type in the U. S. National Herbarium, no. 715696, collected near Remedios, eastern Chiriquí, Panama, among remnants of forest, flowers, December 30, 1911, by H. Pittier (no. 5467).

This species is supposed to belong to the section Dipterae and does not seem ever to have been described. It may correspond to the Guatemalan tree called *Terminalia excelsa* by Liebmann, but not further characterized. This latter name, however, could not stand for this species, since it has been used subsequently by Glazilou to designate a Brazilian tree.

*Terminalia hayesii* Pittier, sp. nov.

A tree (?), the ultimate branchlets ferruginous-pubescent. Leaves membranous, clustered at the ends of the branchlets, eglandular, the petioles shallow-canaliculate above, ferruginous-pubescent, thicker at the base, 5 to 7 mm. long, the blades obovate-oblong, long-cuneate at the base, abruptly short-acuminate at the apex, 6.5 to 11 cm. long, 2.3 to 3.7 cm. broad, dark green and sparsely pubescent above, paler, reticulate, and ferruginous-pubescent on the costa beneath, ciliate on the margin at the base. Floral spikes densely flowered, growing from the base of the new shoots, the rachis 6 to 12 cm. long, villous-tomentose; flowers sessile; calyx sessile on the ovary, cupuliform, 5-lobulate, grayish-villous without and within, the limb about 1.5 mm. high, the lobes triangular, subacute, reflexed, 0.7 to 0.8 mm. long; stamens 10, glabrous, about 3 mm. long, the anthers ovate; disc inconspicuous, densely villous-tomentose; ovary ovoid, sessile, 1 mm. long, densely long villous tomentose; style shorter than the stamens, villous except at the apex.

Type in the U. S. National Herbarium, no. 202835, collected in Panama by Sutton Hayes in 1859-60.

The American species of the genus *Terminalia* have been so imperfectly described that it is often difficult to distinguish them. The one just described may be either the *T. obovata* or *T. buceras* indicated in *Biologia Centrali-Americana* as collected by Hayes, but in neither case would the specimens justify the identification. These latter are characterized mainly by the short, densely villous ovary and by the relatively broad limb of the equally villous, cupuliform calyx, with reflexed lobes.

#### THE MEXICAN AND CENTRAL AMERICAN SPECIES OF COMBRETUM, SECTION MICROPETALAE.

The section Micropetalae Engl. & Diels, of the genus *Combretum*, includes about 17 South and Middle American species, characterized within the genus by their large flowers, brilliantly colored in several hues of red and yellow. The best known South American species is probably *C. loeflingii* Eichl., extending from southern Brazil to Colombia. The Central American collections have been referred generally to *C. farinosum* H. B. K., but an examination of the specimens under that name in the United States National Herbarium shows this species to be exclusively Mexican, the Central American forms representing 3 old species, another described by Capt. John Donnell Smith as a variety of *C. farinosum*, and 4 new types.



Among these 9 species distributed between Darién (Panama) and central Mexico, one, *C. sambuense*, is distinguished by large, orange red flowers, a sparsely branched inflorescence, and very broad leaves. At first sight, it may be easily confused with *C. coccineum* (Aubl.) Engl. & Diels, which grows in the same region.

In *Combretum superbum* we have another feature which affords ground for immediately sorting it out of the general collection: the panicles present several opposite branchlets, which in their turn bear from 2 to 5 pairs of opposite spikes. This I call a twice-branched panicle; in all the other species considered here the floral spikes issue directly from the main axis. This arrangement of the inflorescence, as noted in *C. superbum*, occurs in other American species belonging to distinct sections, as for instance in *C. leprosum*; in *C. melliflorum* the branching is carried even further. But it is a good distinctive character in so far as the Central American species are concerned.

The 7 remaining species are founded primarily on the variations in the shape and the indument of the petals, and secondarily on characters derived from the calyx and leaves. The fruits also seem to vary in size and indument according to the species, but they are seldom present in the specimens at hand.

As to shape there are 3 types of petals. In *C. farinosum* they are distinctly oblong-spatulate, very narrow in proportion to their length, and with a long claw; whereas they are sessile in all other species, being ovate and decidedly shorter than the calyx lobes in some cases, almost orbicular and mostly equaling the calyx lobes in other instances.

*Combretum phaenopetalum*, *C. polystachyum*, and *C. argenteum* are the species with ovate petals, the first differing from the two latter in the less degree of hairiness of the calyx inside and of the disc margin, and in the extreme length of the style. A very long panicle with 6 to 8 pairs of opposite spikes, glabrous petals, and a calyx sparsely villous within, distinguish *C. polystachyum* from *C. argenteum*, which has pilosulous petals, a character not found in other species of the section.

The group with orbicular petals includes *C. erianthum* Benth., originally described from specimens collected by Hartweg at Retalhuleu, Guatemala, and probably confused by Eichler<sup>1</sup> with a Brazilian species growing near Rio de Janeiro. It is characterized by having the calyx densely villous-tomentose without, and is possibly the species referred to by Eichler as *C. warscewiczianum*.<sup>2</sup> The two remaining species, *C. benthamianum* and *C. lepidopetalum*, differ from *C. erianthum* in having their calyx densely covered with whitish or brownish scales. In *C. benthamianum* the petals are glabrous, while they are sparsely scaly in *C. lepidopetalum*.

<sup>1</sup> In Mart. Fl. Bras. 14<sup>a</sup>: 108. 1867.

<sup>2</sup> Op. cit. 110.



The 9 types are sufficiently well characterized, to my mind, to be considered as so many distinct species. For those, however, who may object to an extreme division, they may be reduced to six, as follows:

1. *C. sambuense* Pittier.
2. *C. superbum* Pittier.
3. *C. farinosum* H. B. K.
4. *C. argenteum*, with *C. phaenopetalum* and *C. polystachyum* as subspecies.
5. *C. erianthum* Benth.
6. *C. benthamianum*, with *C. lepidopetalum* as a subspecies.

The following character is for the Central American and Mexican species only.

**Combretum**, section **Micropetalae** Engl. & Diels in Engl. Monogr. Afrik. Pflanzenfam. 3: 10. 1899.

Flowers tetramerous. Calyx funnelform or turbinate-campanulate. Petals small, equal to the lobes or shorter. Stamens 8, much exceeding the calyx, the filaments erect, the anthers ovate or oblong. Disc adnate to the calyx, the margin free and more or less hairy. Ovary ovate or fusiform, more or less stipitate. Fruit a 4-winged samara.

Vines or shrubs, the leaves and inflorescences more or less covered with white or brown scales, the leaves opposite, the inflorescence usually terminal, paniculate, once branched or rarely twice branched, the flowers usually secund in the spikes.

#### KEY TO THE SPECIES.

- Leaves large for the section, 15 cm. long and up to 9.5 cm. broad; flowers also large, about 2 cm. long, including the ovary----- 1. *C. sambuense*.
- Leaves 4 to 14 cm. long or longer, but always narrower than in the preceding; flowers not over 1.5 cm. long. Panicles twice branched----- 2. *C. superbum*.
- Panicles once branched.
- Petals oblong-spatulate, 2 mm. long, 0.8 to 1 cm. broad. Anthers oblong----- 3. *C. farinosum*.
- Petals of broader forms.
- Petals ovate.
- Calyx funnelform, narrow, sparsely villous within; margin of the disc sparsely villous----- 4. *C. phaenopetalum*.
- Calyx turbinate-campanulate, densely scaly without; margin of the disc densely long-villous.
- Panicles up to 45 cm. long, with 6 to 8 pairs of spikes; petals glabrous--- 5. *C. polystachyum*.
- Panicles short, sparsely branched; petals minutely pilosulous without----- 6. *C. argenteum*.
- Petals suborbicular.
- Calyx villous-tomentose without----- 7. *C. erianthum*.
- Calyx scaly without.
- Petals scaly, shorter than the calyx lobes- 8. *C. lepidopetalum*.
- Petals glabrous, equaling the calyx lobes----- 9. *C. benthamianum*.



1. *Combretum sambuense* Pittier, sp. nov.

A vine, the old bark smooth, grayish, the young branchlets 4-marginate (or very narrowly 4-winged). Leaves coriaceous, the petioles thick, flattened and marginate above, scaly, 1 cm. long, the blades broadly ovate, broadly rounded at the base, acute, obtuse, or subacuminate at the apex, 11 to 15 cm. long, 5.5 to 9.5 cm. broad, glabrous, reticulate and lustrous above, paler and minutely scaly beneath. Panicle branches undivided, scaly-pubescent; flowers purplish yellow; calyx narrow at the base, funnel-shaped, coriaceous, minutely scaly-pubescent without, villous above the disc within, about 1.5 cm. long, the lobes rounded, acute, 3.5 to 3.8 mm. long, minutely pubescent within; petals yellow, more or less broadly ovate, acute, 2.5 to 4 mm. long, 2 to 2.5 mm. broad, glabrous; stamens 8, very long, the filaments erect, about 2.5 cm. long, yellow, each with a thick, brushlike tuft of yellowish hairs at the insertion; anthers pinkish; disc margin inconspicuous; ovary strongly 4-angled, stipitate, scaly, about 4 mm. long; style glabrous, apiculate, longer than the stamens.

Type in the U. S. National Herbarium, no. 715807, collected along the Sambú River, southern Darién, Panama, flowers, February 1, 1912, by H. Pittier (no. 5548).

This species is very distinct from any other heretofore reported from Central America and the adjacent parts of South America.

2. *Combretum superbum* Pittier, sp. nov.

A climbing vine, the old bark gray, glabrous, the young branchlets 4-angled, densely brown-scaly. Leaves coriaceous, the petioles canaliculate, scaly, 1.2 to 1.5 cm. long, the blades ovate to ovate-elliptic, acute and subattenuate at the base, acuminate at the apex, 7 to 14 cm. long, 3 to 5.5 cm. broad, glabrous above, densely brownish-scaly beneath. Inflorescences broadly paniculate, twice branched, the main branches densely scaly, strongly quadrangular, the spikes opposite, about 8 cm. long, the rachis brownish-scaly and pubescent; bracts replaced by normal leaves subtending both the main branchlets and the spikes; floral bractlets inconspicuous; calyx funnelform-campanulate, 7 mm. long,

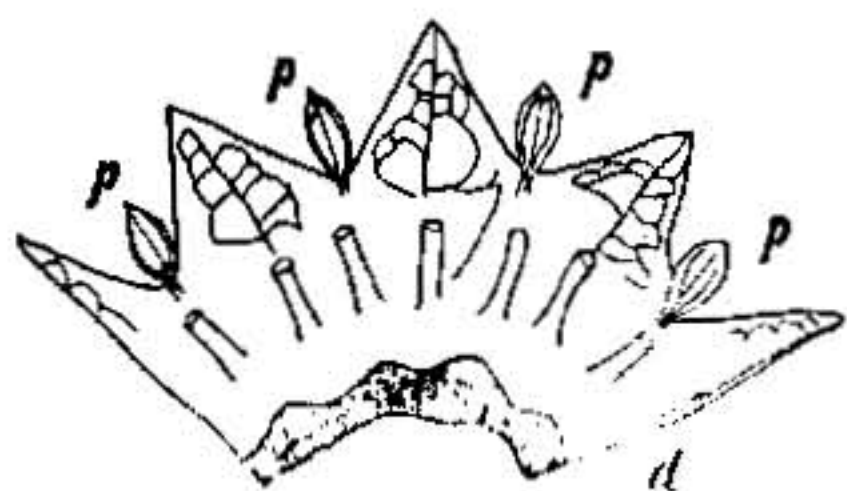


FIG. 98.—Perianth of *Combretum farinosum* spread out, the stamens cut off. *pp*, Petals; *d*, disc. Scale 2.

coriaceous, yellow, densely brownish-scaly without, villous-tomentose within, the lobes triangular, acute, about 2.5 mm. long; petals ovate, acuminate, sulphur-yellow, 1.5 to 1.7 mm. long, 1.1 to 1.3 mm. broad, glabrous; stamens 8, the filaments straight, yellow, about 18 mm. long; anthers ovate, purplish; disc margin free, long-villous; ovary brown-scaly without, 4-angled, stipitate, 6 to 8 mm. long; style glabrous, slender, slightly surpassing the stamens.

Type in the U. S. National Herbarium, no. 677068, collected around Culebra, Canal Zone, Panama, flowers, January 1, 1911, by H. Pittier (no. 2158).

This species is distinguished from all the other Central American representatives of the Micropetalae by its long-petiolate leaves and the form of its inflorescence, this composed of several branches, each of which bears 4 or 5 pairs of opposite spikes. The floral characters also are sufficient to characterize *C. superbum* as a distinct species.

3. *Combretum farinosum* H. K. B. Nov. Gen. & Sp. 6: 110. 1823. FIGURE 98.

A climbing vine, the branchlets few, terete, smooth, whitish gray, glabrous, the younger growth grayish-scaly. Leaves subcoriaceous, the petioles semiterete, canaliculate, 0.7 to 2 cm. long, grayish-scaly, the blades ovate-oblong, rounded-attenuate at the base, obtusely acuminate, 6 to 12 cm. long, 4 to 8 cm. broad,



minutely white-dotted above, distinctly white-scaly beneath. Panicles once branched, erect, 9 to 12 cm. long, many-flowered, the rachis angulate, densely scaly. Flowers sparse, orange yellow; calyx articulate upon the ovary, campanulate, stipitate, densely scaly without, villous-tomentose within, principally at the insertion of the stamens, the limb about 10 mm. long, the lobes 3.5 mm. long, triangular, acute; petals spatulate-oblong, acute, glabrous, 2 mm. long, 0.8 to 1 mm. broad; stamens 8, the filaments about 2.5 cm. long, the anthers oblong; disc glabrous within, the free margin 4-sinuate, densely long-villous; ovary fusiform, 4-angled, substipitate, densely scaly, about 4 mm. long; style slender, glabrous, apiculate, slightly surpassing the stamens. Fruit about 16 mm. long and 18 mm. in diameter across the wings, these glabrous, more or less densely scaly. Seed single, linear-fusiform, glabrous.

Type from between Acapulco and Venta del Ejido, Mexico.

OTHER COLLECTIONS:

MEXICO: Mazatlán, flowers, January to March, 1902, *C. A. Purpus* 366.

Vicinity of Acapulco, fruits, May 5, 1895, *Palmer* 397.

4. *Combretum phaenopetalum* (Donn. Smith) Pittier, sp. nov.

*Combretum farinosum* H. B. K. var. *phaenopetalum* Donn. Smith, Bot. Gaz. 23: 7. 1897.

A climbing vine, the branchlets glabrous, more or less quadrangular toward the ends. Leaves subcoriaceous, the petioles canaliculate, scaly-pubescent, 6 to 8 mm. long, the blades ovate to elliptic, rounded and short-attenuate at the base, acutely acuminate at the apex, 9 to 13 cm. long, 3.5 to 5.5 cm. broad, minutely dotted above, paler, reticulate, and white or brownish-scaly beneath. Panicles sparingly branched, the spikes 2 to 8 cm. long, the rachis scaly and brownish-pubescent; calyx funnelform, narrow, stipitate, about 1 cm. long, brownish-scaly without, sparsely pilosulous within, the lobes triangular, sub-acute, 2.2 mm. long; petals ovate, apiculate, glabrous, 1.6 to 1.8 mm. long, 0.8 to 0.9 mm. broad; stamens 8, glabrous, the filaments about 16 mm. long, the anthers ovate; disc glabrous inside, the sinuate margin sparsely villous; ovary substipitate, scaly, about 3 mm. long; style much longer than the stamens. Samara brownish-scaly.

Type in the U. S. National Herbarium, no. 252374 collected near Nentón, Department of Huehuetenango, Guatemala, flowers and fruits, December, 1895, by E. W. Nelson (no. 3534).

OTHER COLLECTIONS:

GUATEMALA: Cubilquitz, Alta Verapaz, flowers, February, 1900, *von Türckheim* (J. D. Smith, no. 7621). Santa Rosa, Department of Santa Rosa, flowers, November, 1892, *Heyde & Lux* (J. D. Smith, no. 4173).

This shrub is sufficiently well marked to be elevated to specific rank. At all events, it can hardly be considered a variety of *C. farinosum*, from which it departs in its short petioles, larger leaf blades, shorter floral spikes, the rachis of which is covered with a mixture of scales and brownish pubescence, much narrower calyx, with shorter lobes and very sparsely villous within, smaller, ovate petals, disc sparsely villous on the margin, and style exceeding the stamens about 7 mm.

5. *Combretum polystachyum* Pittier, sp. nov.

FIGURE 99.

A climbing vine, the stems subquadrangular, scaly toward the ends. Leaves coriaceous, the petioles semiterete, deeply canaliculate, densely white-scaly, 0.8 to 1 cm. long, the blades ovate to elliptic-oblong, rounded and attenuate at the base, acute or short-acuminate at the apex, 4 to 8 cm. long, 2 to 5 cm. broad, white-scaly and punctulate above, paler and more densely white-scaly beneath. Panicles 30 to 45 cm. long, with 6 to 8 or more pairs of opposite



spikes, these 8 to 10 cm. long, subtended by small leaves, the rachis thick, angular, puberulous, densely flowered; calyx turbinate-campanulate, about 6 mm. long, densely scaly without, the scales intermixed with a minute indument, villous-tomentose inside, the lobes broadly triangular, subacute, 2.2 mm. long; petals ovate, rounded or acuminate at the apex, glabrous, 0.9 to 1 mm. long, 0.6 to 0.7 mm. broad, much shorter than the calyx lobes; stamens 8, the filaments glabrous, 1.8 to 2 cm. long, the anthers ovate; disc glabrous inside, densely villous on the scarcely sinuate margin; ovary substipitate, fusiform, 4-angular, densely scaly, 4 mm. long. Fruit about 2 cm. long, 18 mm. across the wings, pubescent at first, the pedicels scaly, 3 mm. long.

Type in the U. S. National Herbarium, no. 577548, collected on the banks of the Diquís River at Currés, near Boruca, Costa Rica, March 4, 1898, by H. Pittier (Inst. Fís. Geogr. Costa Rica, no. 12140).

OTHER COLLECTIONS:

COSTA RICA: Around Nicoya, in thickets, flowers, February, 1900, *Tonduz* (Inst. Fís. Geogr. Costa Rica, no. 13502).

NICARAGUA: Without locality data, *C. Wright*, U. S. North Pacific Exploring Expedition, 1853-56. Realejo, Department of Chinandega, flowers, January 16, 1903, *Baker* 2088.

This species is easily distinguished on account of its long panicles, with many pairs of spikes, narrow leaves, and diminutive petals. It is closely related to *C. argenteum* Bertol., but the petals are glabrous and smaller, the stamens longer, and the indument somewhat at variance.

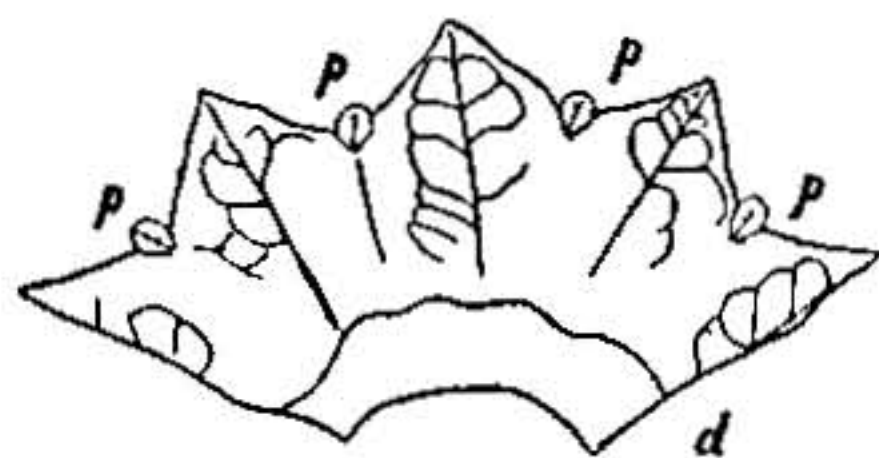


FIG. 99.—Perianth of *Combretum polystachyum* spread out, the stamens removed. *pp*, Petals; *d*, disc. Scale 2.

3. *Combretum argenteum* Bertol. Nov. Comm. Acad. Bonon. 4: 412 1840.

A trailing vine, the old parts gray, glabrous, the new growth sparsely white or brownish-scaly. Leaves coriaceous, the petioles semiterete, canaliculate, 1 to 1.2 cm. long, densely whitish-scaly, the blades ovate-oblong, rounded-attenuate and subdecurent at the base, acute or obtuse and emarginate at the apex, 5 to 11 cm. long, 2.5 to 5.5 cm. broad, sparsely white-scaly and punctulate above, a little more densely so beneath; stipules foliaceous. Panicles sparsely branched, the rachis angular, densely brownish or whitish-scaly; branches simple; calyx turbinate-campanulate, 7 mm. long from the base of the limb, densely white-scaly without, sparsely white-villous within, the lobes triangular, acute, 1.5 to 2 mm. long, the sinuses broad and rounded; petals ovate, acute, 1 to 1.1 mm. long, 0.7 mm. broad, minutely pilosulous without; stamens 8, the filaments 12 to 15 mm. long, glabrous, the anthers ovate, pink; disc adnate to the calyx, glabrous within, densely white-villous on the sinuate free margin; ovary 4-angled, sessile, densely scaly, about 2 mm. long.

Type from Volcán de Agua, Guatemala.

OTHER COLLECTIONS:

MEXICO: Manzanillo.

GUATEMALA: El Rancho, Department of Jalapa, flowers, January 6, 1906, *Kellerman* 5648. Near Trapiche Grande, Department of Guatemala, flowers, January 23, 1905, *Maxon* 3420.

SALVADOR: Tecoluca, Department of San Vicente, flowers, January, 1893, *Shannon* (J. D. Smith, no. 5038).

This differs from *C. farinosum* principally in the characters of the flower, this being smaller, with ovate, minutely pilosulous petals and ovate anthers. The villosity of the calyx inside is also less and the petioles are longer.



7. *Combretum erianthum* Benth. Pl. Hartw. 73. 1840.

2 *Combretum warscewiczianum* Eichl. in Mart. Fl. Bras. 14<sup>a</sup>: 110. 1867, hyponym.

A shrub or climbing vine with erect stems and flexuous, glabrous branchlets. Leaves coriaceous, the petioles semiterete, canaliculate, sparsely scaly, 6 to 7 mm. long, the blades oblong-elliptic, more or less rounded and abruptly attenuate at the base, acute at the apex, 10 to 15 cm. long, 3.5 to 5.5 cm. broad, reticulate, dark green and glabrous above, light green and densely brownish-scaly beneath. Panicles sparingly branched, the spikes about 10 cm. long, many-flowered, the rachis angular, tomentose; calyx stipitate, campanulate, 0.8 to 1 cm. long, densely villous-tomentose and sparsely scaly without, glabrescent or sparsely villous within, the lobes triangular, subacute, about 2.5 mm. long; petals orbicular-acuminate, glabrous, 2.5 mm. long, 2 to 2.2 mm. broad, equaling the calyx lobes; stamens 8, glabrous, the filaments about 2.3 cm. long, the anthers ovate; ovary subclavate, substipitate, 4-angular, villous, 4.5 mm. long; style slightly exceeding the stamens.

Type from Retalhuleu, Guatemala.

Again collected at El Cedral de Gualán, on the road to Copán, Guatemala, altitude about 400 meters, flowers, January 5, 1906, Pittier 1874.

The writer's collection agrees closely with Bentham's description, except in the petals being equal to the calyx lobes and not shorter. Eichler's name, applied to specimens from Costa Rica and Nicaragua, is probably a synonym.

8. *Combretum lepidopetalum* Pittier, sp. nov.

A climbing vine, the branchlets terete, more or less scaly-pubescent. Leaves submembranous, the petioles semiterete, canaliculate, scaly-pubescent, 6 to 9 mm. long, the blades ovate, rounded and short-attenuate at the base, obtuse, acute, or short-acuminate at the apex, 7 to 10 cm. long, 3.5 to 5 cm. broad, dark green and very sparsely scaly above, paler and very densely whitish-scaly beneath. Panicles 5 to 9-branched, the spikes 7 to 9 cm. long, the rachis pubescent, the indument intermixed with few scales, yellow; calyx funnelform-campanulate, about 1 cm. long, densely fulvous-scaly without, tomentose-pubescent within, the lobes triangular, subacute, about 1.8 cm. long; petals suborbicular, abruptly acuminate, sparsely scaly, 2.3 to 2.5 mm. long, 1.9 to 2.1 mm. broad; stamens 8, the filaments glabrous, about 2.2 cm. long, the anthers ovate, pinkish; disc glabrous and longitudinally plicate within, densely grayish-villous on the free, almost straight margin; ovary ovoid, stipitate, 4-angular, about 4 mm. long, minutely scaly; style exceeding the stamens. Fruit about 18 mm. long, 17 mm. broad across the wings, the pedicels 4 mm. long, puberulous, the wings purplish red, minutely scaly.

Type in the U. S. National Herbarium, no. 715233, collected between Pocrí and Natá, Province of Coclé, Panama, in thickets, flowers, December 7, 1911, by H. Pittier (no. 5006).

Found also around Penonomé, Province of Coclé, fruits, February, 1908, by R. S. Williams (no. 72).

This belongs to the group with suborbicular petals, its nearest affinities being with *C. benthamianum*, from which it differs in having a shorter calyx, densely scaly without and with longer lobes, slightly smaller and scaly petals, and leaves scaly on the upper surface.

9. *Combretum benthamianum* Van Heurck & Muell. Arg. in Van Heurck, Obs. Bot. 220. 1871. FIGURE 100.

A trailing vine, the branchlets terete or subquadrangular, grayish or brownish, glabrous. Leaves coriaceous, the petioles semiterete, canaliculate, sparsely scaly, 0.7 to 1.5 cm. long, the blades ovate or oblong, rounded-attenuate or



cuneate-attenuate at the base, acute or obtuse and emarginate at the apex, 7 to 14 cm. long, 4.5 to 5.5 cm. broad, glabrous and reticulate above, minutely reticulate and densely brownish-scaly beneath. Panicles foliate, the spikes numerous, often 3 or 4-verticillate, 9 to 12 cm. long, the rachis subquadrangular, ferruginous-pubescent, scarcely scaly; calyx funnelform-campanulate, articulate

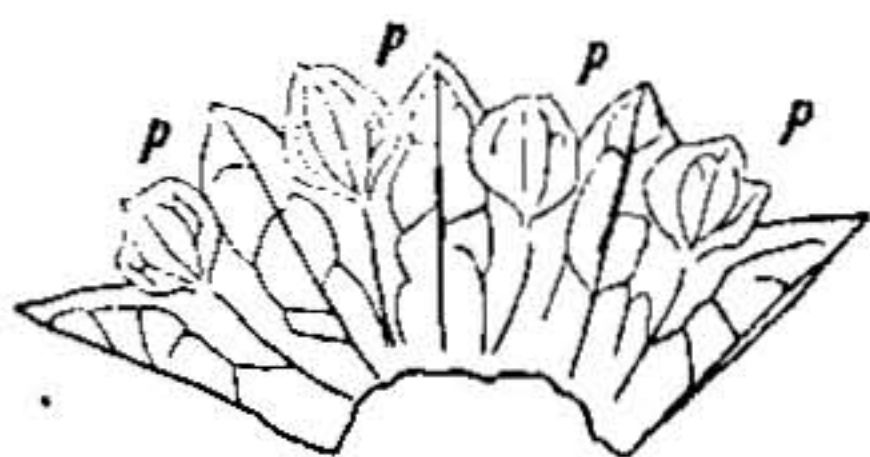


FIG. 100.—Perianth of *Combretum benthamianum* spread out. pp, Petals. Scale 2.

upon the ovary, sparsely brownish-scaly without, slightly fulvous-villous on the limb within, about 12 mm. long, the lobes rounded-triangular, acute, glabrous inside, minutely pilosulous on the margin, about 3 mm. long; petals sub-orbicular or broadly ovate, glabrous, more or less distinctly apiculate, 2.2 to 3 mm. long, 2.2 to 2.5 mm. broad, equaling the calyx lobes; stamens 8, the filaments about 2.2 cm. long, the anthers ovate; disc glabrous within,

densely villous on the free, slightly sinuate margin; ovary fusiform, 4-marginate, scaly-puberulous, stipitate, 4 to 5 mm. long; style exceeding the stamens. Follicles sparsely scaly on the wings, 2 cm. long, 1.8 cm. broad across the wings, the pedicel pilosulous, 3 mm. long; seed oblong, acute at both ends, smooth, about 7 mm. long, 4-winged, 2 of the wings broader.

Type from Guatemala.

Again collected in the vicinity of San Salvador, El Salvador, flowers and fruits, by Dr. C. Renson (nos. 36, 68).

This differs from *C. farinosum* H. B. K. in its smaller flowers and sub-orbicular petals and in its indument. From the closely allied *C. argenteum* Bertol. it departs in having the leaves perfectly glabrous above, the panicles profusely branched, with a pubescent rachis, and the petals much larger and proportionally broader.

#### FOUR NEW OR IMPERFECTLY KNOWN SPECIES OF COMBRETUM OF OTHER SECTIONS.

*Combretum alternifolium* Pers. Syn. Pl. 1: 412. 1805.

A vine, the branchlets terete, grayish, sparsely covered with minute white scales, the younger parts sparsely brownish-pubescent. Leaves subcoriaceous, alternate, the petioles terete, subcanaliculate, 0.5 to 1 cm. long, pubescent, the blades broadly ovate, rounded and sometimes oblique at the base, acute or sub-obtuse and mucronate at the apex, 5 to 7.5 cm. long, 3.5 to 5 cm. broad, glabrous, dark green above, paler and reticulate beneath. Inflorescence broadly paniculate, many-flowered, the rachis minutely brownish-pubescent and sparsely scaly, the branchlets opposite, subopposite, or alternate, those near the base subtended by caducous leaves, those toward the apex by caducous, subulate, densely brownish-hairy bracts about 3 mm. long. Flowers opposite or alternate in the spikelets, the bractlets subulate, glabrous, about half the length of the ovary; calyx campanulate, 5-lobed, about 2 mm. long, glabrous without, long-hairy inside at the insertion of the stamens; petals 5, oblong, narrower at the base, obtuse and often emarginate at the apex, 2.3 to 2.5 mm. long, 1 to 1.1 mm. broad, densely villous-tomentose on both sides, white; disc tubular, surrounding the style, crowned with long stiff hairs; ovary fusiform, stipitate, 5-angled, glabrous, about 2.5 mm. long; style subulate, 5.5 mm. long, surpassing the stamens.

Type from Cartagena, Colombia.

#### OTHER COLLECTIONS:

PANAMA: Iguana Island, *Seemann*. Punta Patiño, southern Darién, along the beach (with *Hippomane*), flowers, April 27, 1914, *Pittier* 6607.



Persoon's characterization of his *C. alternifolium* applies almost equally to my nos. 4002 and 6607. The former, however, is glabrous or almost so and well characterized besides by the glandular dots covering the ovaries and branchlets, a detail which would hardly escape observation. On the other hand, the climatic conditions of the district where the specimens of the latter number were collected resemble more those of Cartagena, the original locality of Persoon's species. Consequently, I refer to this my no. 6607, while no. 4002 is made the type of a new species. I have not seen Seemann's specimens.

. ***Combretum epiphyticum* Pittier, sp. nov.**

A trailing vine, the upper branchlets terete, grayish-puberulous, the younger growth ferruginous-pubescent. Leaves opposite, coriaceous, the petioles 5 mm. long, ferruginous-pubescent, the blades orbicular or ovate, rounded and narrowly emarginate at the base, rounded-obtuse and often emarginate or mucronate at the apex, 5 to 13 cm. long, 4.5 to 7 cm. broad, glabrous except on the ferruginous-pubescent costa above, reticulate and sparsely hairy on the costa, veins, and venules beneath. Inflorescences paniculate at the ends of the branchlets, the rachis ferruginous-pubescent, the branchlets opposite, subtended by a small leaf at the base of the panicle, by a lanceolate, caducous bract 3 to 4 mm. long farther up. Flowers sessile, sweet-scented; bractlets subulate, reddish, hairy, nearly 2 mm. long; calyx broadly campanulate, 4-toothed, about 2 mm. long, sparsely pubescent without and within; petals 4, sessile, broadly ovate or suborbicular, 0.7 to 0.8 mm. long, 1 to 1.2 mm. broad, white, glabrous; stamens 8, glabrous, 4 opposite the calyx teeth and inserted at the margin of the disc, 4 opposite the petals and inserted a little higher on the calyx limb, the filaments 2 to 2.2 mm. long, subulate, the anthers ovate; disc thin, dark brown, adnate to the calyx, glabrous; ovary inferior, ovoid, about 1.5 mm. long, densely fulvous-hairy; style glabrous, subulate, longer than the stamens.

Type in the U. S. National Herbarium, no. 716878, collected at Caño Quebrado, Canal Zone, Panama, growing on dead tree in lake, flowers, October 31, 1914, by H. Pittier (no. 6819).

Collected also at the type locality, June 14, 1914, *Pittier* 6668, and near Gatún, Canal Zone, in swamps, flowers, March 9, 1860, *Hayes* 7.

This species is characterized by the pubescence, the reddish bractlets, the sessile petals, and the long, fulvous indument covering the ovary. It is closely allied to *Combretum jacquini* Griseb., differing mainly in the shape of the petals and in the hairiness of the leaves and ovary.

***Combretum nicoyanum* Pittier, sp. nov.**

A climbing vine, the branchlets terete, glabrous or glabrescent, the young growth grayish-pubescent. Leaves coriaceous, opposite or subopposite, the petioles densely brownish-hairy, 6 to 8 mm. long, the blades ovate or obovate, rounded at the base, more or less abruptly acuminate at the apex, 4.5 to 9.5 cm. long, 3 to 4.5 cm. broad, at first ferruginous on both sides, later glabrous or glabrescent above, reticulate and puberulous beneath, principally on the costa and veins. Inflorescence terminal, paniculate, loose, the rachis densely brownish-pubescent, the branchlets slender, opposite, subopposite, or in whorls of 3, subtended at the base by small leaves, further up by lanceolate, caducous bracts about 4 mm. long; flowers subsessile, each provided with a subulate, caducous bractlet shorter than the ovary; calyx cuplike, 5-toothed, about 2 mm. long, pilosulous without, barbellate within at the insertion of the stamens; petals 5, sessile, obovate, rounded or emarginate at the apex, 2 to 2.3 mm. long, 0.9 to 1.2 mm. broad, white, minutely hairy and ciliate; stamens 10, the 5 opposite the petals inserted higher than those opposite the calyx teeth, the filaments long and twisted, the anthers ovate; disc tubular; ovary linear,



substipitate, 5-angled, pilosulous. Fruit glabrous, fusiform, 5-winged, about 16 mm. long and 17 mm. in diameter, including the wings.

Type in the U. S. National Herbarium, no. 577731, collected near Nicoya, Costa Rica, in thickets, flowers, January, 1900, by A. Tonduz (Inst. Fis. Geogr. Costa Rica, no. 13503). No. 16982 of this series is the same species from the same locality.

*Combretum punctulatum* Pittler, sp. nov.

A thorny, climbing vine, the branchlets terete, brownish-pubescent. Leaves alternate, membranous, the petioles terete, brownish-pubescent, 3 to 5 mm. long, the blades ovate, rounded at the base, long-acuminate and mucronate at the apex, 5 to 8 cm. long, 2.5 to 3.2 cm. broad, glabrous and dark green above, paler beneath, the costa and veins sparsely pubescent, and the axils of the veins barbellate. Inflorescence broadly paniculate, the rachis pubescent and sparsely dotted with minute dark glands, the larger branches alternate and subtended by normal leaves, the secondary branches subopposite, with small, lanceolate, sparsely hairy, caducous bractlets, these about 4 mm. long. Flowers numerous, alternate or subopposite, the bractlets lance-subulate, shorter than the ovary; calyx campanulate, 5-lobate, about 2.5 mm. long, glabrous without, except at the minutely hairy apex of the lobes, long-hairy inside at the insertion of the stamens; petals 5, sessile, obovate-oblong, 1.8 to 2 mm. long, 0.8 mm. broad, white, more or less hairy and ciliate, especially toward the apex; disc tubular, surrounding the base of the style, 0.2 to 0.3 mm. high, bearing a crown of stiff hairs about 0.5 mm. long; ovary fusiform, substipitate, 5-angled, 1.5 to 1.7 mm. long, sparsely brownish-pubescent and dotted with minute dark glands; style glabrous, subulate, about 5.5 mm. long.

Type in the U. S. National Herbarium, no. 679085, collected along the Trinidad River, Canal Zone, Panama, flowers, July 19, 1911, by H. Pittler (no. 4002).

This differs from *C. alternifolium* in having its leaves pubescent on the costa and veins beneath, and the ovary also pubescent and covered with darkish glandules.

## MELASTOMATACEAE.

### AN OLD AND A NEW SPECIES OF MICONIA.

*Miconia darienensis* Pittler, sp. nov.

Section Eumiconia, subsection Paniculares. A tree up to 20 meters high, the trunk 40 cm. in diameter; bark gray or reddish gray, smooth; crown elongate, with ascending limbs; young branchlets very short, obscurely tetragonous, sparsely puberulous.

Leaves membranous, entire, glabrous, the blade trinervate from above the base and with inconspicuous marginal pseudo-nerves. Petioles 0.5 to 1 cm. long, rather thick, slightly canaliculate and puberulous. Leaf blades 8 to 24 cm. long, 2 to 5 cm. broad, elliptic-lanceolate, acute at base and more or less obtusely acuminate at the apex, dark green above, paler beneath. Lateral nerves starting at about 1 cm. from the base of the lamina; transverse veins almost perpendicular to the costa (angle about 84 degrees).

Panicles terminal, about 10 cm. long, ovoid-globose or pyramidal, the secondary branches, except at the basal node, 4 to each node, 2 of these being short and simple and 2 longer and again branched. Rachis of the panicle glabrous or slightly puberulent. Flowers pentamerous, pediceled, about 7 mm. long (including pedicels), clustered at the ends of the ultimate branches of the rachis. Pedicels 1 to 1.5 mm. long, slender, glabrous. Calyx campanulate,



distinctly 5-toothed, glabrous, 1.5 mm. long. Petals obliquely obovate, slightly emarginate at the apex, glabrous, 2.5 mm. long, 1.8 mm. broad, white. Stamens 10, about 5 mm. long, pubescent, the filaments slender, the anthers gibbous and bilobulate at the base, opening by an apical pore. Ovary globose; style 4.5 mm. long, pubescent; stigma capitate. Berries bluish black.

Type in the U. S. National Herbarium, no. 715709, collected on a thinly forested hill near La Palma, southern Darién, Panama, flowers, January 25, 1912, by H. Pittier (no. 5478).

This species of *Miconia* ranks among the largest representatives of the group and takes its place between *M. poeppigii* Triana and *M. pyrifolia* Naud. From the first it differs mainly by its leaves, these being entirely glabrous but for the petioles, their petioles shorter and blades longer, and by its glabrous calyx and pubescent stamens and style; from the second it is distinguished by its habit, the obscurely tetragonous branchlets, and the shape and size of the details of the flower.

***Miconia fulva* DC. Prodr. 3: 180. 1828.**

Section Chaenantha. A tree, reaching a height of 10 meters, the trunk with a basal diameter of about 30 cm. Trunk straight; crown elongate or pyramidal; bark reddish. Young twigs acutely 4-angled, covered, like the petioles and lower face of the leaves, the rachis of the inflorescences, and the calyx of the flowers, with a dense coating of golden brown, stellate scales.

Leaves membranous, opposite or 3 or 4-verticillate, petiolate, smooth and almost glossy on the upper face, 3-nerved from the base of the blade with 2 marginal pseudo-nerves. Petiole angular or sulcate, deeply canaliculate, 5 to 12 mm. long; leaf blades 7 to 23 cm. long, 1.5 to 5 cm. broad, lanceolate, subacute at the base, acute and long-acuminate at the apex; nerves and transverse veins impressed above, the former salient beneath, the latter forming with the costa an angle of about 68 degrees; margin obscurely sinuate.

Panicles terminal, 10 to 15 cm. long, pyramidal, the primary branches of the rachis angular the secondary ones in whorls of 4, subequal. Flowers pentamerous, sessile, about 4 mm. long, one opening at a time in each small cluster. Calyx campanulate, 2 mm. long, irregularly denticulate on the margin, covered outside with minute stellate scales, darker in the center. Petals 2.2 mm. long, 1.5 mm. broad, ovate, irregularly denticulate-truncate at the tip, white. Stamens 10, 3 to 3.5 mm. long, glabrous; filaments flattened, deflexed; anthers cuneate, truncate at tip, splitting lengthwise.

Ovary semiinferior; style about 4 mm. long, glabrous, slightly clavate.

Type from Cayenne.

OTHER COLLECTIONS:

PANAMA: Around San Felix, eastern Chiriquí, in open forest, flowers, December 17, 1911, Pittier 5171; flowers, December 23, 1911, Pittier 5265.

## SAPOTACEAE.

### A NEW SPECIES OF MIMUSOPS.

***Mimusops darienensis* Pittier, sp. nov.**

A large tree, 40 to 50 meters high, the trunk often over 1.5 meters in diameter. Main roots 3 or 4, powerful but almost even with soil surface and never buttressed. Trunk straight; bark grayish brown and scaly. Limbs strong, horizontal, forming a depressed, spreading crown. Young shoots thick, grayish and more or less brownish pubescent.

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Leaves alternate, petiolate, thick and coriaceous, crowded at the ends of the shoots. Petioles 2 to 3 cm. long, rather thick, roundish, obscurely canaliculate or flattened above. Leaf blades 8 to 14 cm. long, 4.5 to 6.5 cm. broad, obovate or oblong-elliptic, short-acute at the base, rounded-obtuse at the apex, smooth and almost glossy above, at first golden brown or ferruginous beneath, becoming brownish green. Costa impressed above, very salient beneath; primary veins slender, parallel, numerous (about 38 on each side of costa), scarcely distinct on the upper face of leaf, slightly salient beneath and anastomosed along the margin. Stipules narrowly lanceolate, about 5 mm. long, caducous.

Flowers fasciculate in the axils of the leaves, 3 to 12 in each cluster. Pedicels about 3 cm. long (equal to, or longer than, the petioles), more or less brownish-pubescent and thickening toward the end. Sepals 6, biseriate, about 6 mm. long, 3 to 3.5 mm. broad, ovate, obtuse or more or less attenuate at the tip, coriaceous, the 3 exterior ones downy-pubescent, the interior ones grayish-pubescent outside, all glabrous inside. Corolla caducous, about 6.5 mm. long, white, minutely pubescent outside, glabrous inside, spreading; tube 1.5 mm. long; lobes 18, the 6 interior ones 4 mm. long, narrowly lanceolate with rounded tip and inflexed margin, the 12 exterior ones about 5 mm. long, lanceolate, acute, broad at the base (1.5 to 2 mm.), a few entire, but the most bifid. Staminalodes and stamens connate at the base, the former lanceolate, subulate, about 2 mm. long, more or less minutely denticulate on the margin. Stamens 6, about 3 mm. long; filaments subulate; anthers ovate, short-apiculate, extrorse. Pistil entirely glabrous, 6.5 mm. long; ovary 9-celled.

Type in the U. S. National Herbarium, no. 679446, collected on hills back of Puerto Obaldía, San Blas Coast, Panama, flowers, August 31, 1911, by H. Pittier (no. 4318).

OTHER COLLECTIONS:

PANAMA: Forests of the hills around Gatún, Canal Zone, leaves only, February, 1911, Pittier 2699. Hills of Sperdí, near Puerto Obaldía, San Blas Coast, young fruits, September 5, 1911, Pittier 4384.

Of no. 4318, the type of the species, no fruits were collected; no. 4384 is a specimen with a fruit in its first stage of development and consequently too immature to furnish good characters. With the leaves of no. 2699, two more advanced berries were obtained, but the whiteness of the seeds shows that they were not quite mature. The fruits are ovoid, perfectly smooth, mucronate, about 3 cm. long and 2.5 cm. in diameter; 8 of the 9 cells are empty, and in each fruit the remaining cell contains 1 seed. This is large and flattened, with the hilum near the lower extremity. Although still immature, these seeds seem to have reached their full size, and measure 12.5 mm. in length, 5.5 mm. in breadth on the hilum side, and 6 mm. in thickness from the hilum to the carina.

With the Costa Rican *Mimusops spectabilis* Pittier, this new species belongs to section Ternaria of the subgenus Eumimusops or Manilkaria. Through its subentire, subulate staminodes, it is related to the former, and also to *M. longifolia* A. DC., but differs widely by other floral characters, as for instance the entire lobes and lobules of the corolla, the scarcely denticulate staminodes, and the multiflorous axial clusters of the inflorescence.

*Mimusops darienensis* has great economic importance as the source of the Panama "balata" or "gutta-percha," and the wood is also very valuable. From an ecological standpoint the tree, which is very abundant in the hilly hinterland of the Caribbean coast, is to be considered as a characteristic element of the rain forests of the eastern part of the Isthmus. Its presence on the southern or Pacific slope has been reported by natives, but as yet lacks confirmation.



## BORAGINACEAE.

## SEVEN NEW SPECIES OF CORDIA.

*Cordia eriostigma* Pittier, sp. nov.

FIGURE 101.

Section *Myxa*, subsection *Laxiflorae*. A middle-sized tree, the crown rounded-depressed, the young branchlets minutely ferruginous-pubescent.

Leaves coriaceous, the petioles thick, angulate, sulcate, glabrous, 1.5 to 1.7 cm. long, the blades ovate or obovate, entire, broadly cuneate at the base, obtuse at the apex, 8 to 14 cm. long, 5 to 7 cm. broad, impressed-reticulate, glabrous, dark green and lustrous above, paler, glabrous, minutely elevated-reticulate beneath, the costa and veins very sparsely ferruginous-pubescent, impressed on the upper face of the blade, very prominent on the nether face.

Inflorescences terminal, cymose-paniculate, the rachis more or less ferruginous furfuraceous pubescent. Flowers single or geminate on a pedicel 3 to 4 mm. long; calyx membranous, broadly campanulate, about 6 mm. long, 3 or 4-lobulate, the lobes acute, sometimes parted at the tip; corolla white, broad, about 9 mm. long (the tube 6 mm. long), subcampanulate, 5-lobulate, glabrous without, densely hairy inside below the insertion of the stamens, the lobes broad, rounded or subacute at the apex, reflexed; stamens free from about 3 mm. above the base of the corolla, the filaments almost glabrous, the anther cells 2 mm. long, ovoid, acute and divaricate at the base; ovary ovoid, obtuse; style glabrous, dividing first into 2 branches, these in their turn divided, the whole about 1.5 mm. long; stigmas large, depressed-ovoid, the surface densely white-woolly.

Drupe not seen.

Type in the U. S. National Herbarium, no. 531695, collected at El Paso de la Balsa, on the Cauca River, near Jamundí, Cauca, Colombia, at an altitude of 980 meters, in flower, February 10, 1906, by H. Pittier (no. 1489).

At the time of its discovery, this tree was profusely covered with the white, very fragrant blossoms and surrounded by swarms of bees, bumblebees, and other insects. It should certainly take a prominent place among the melliferous trees of the Tropics, but does not seem to be of very frequent occurrence in the Cauca Valley. Its affinities are with *Cordia nitida* DC. and *C. lasiocalyx* Pittier.

*Cordia lasiocalyx* Pittier, sp. nov.

Section *Myxa*, subsection *Laxiflorae*. A small or middle-sized tree, entirely glabrous, the trunk low, the crown rounded and spreading; bark smooth, gray on the trunk and limbs, purplish on the branchlets.

Leaves submembranous, dark green above, paler beneath, lustrous on both faces, the petioles rather slender, sulcate, 8 to 14 mm. long, the blades elliptic or oblong-elliptic, 10 to 12 cm. long, 3.5 to 4 cm. broad, cuneate-attenuate at the base, abruptly long-acuminate to the acute, mucronate apex; costa prominent on both faces, the veins and veinlets prominulous, more so on the lower face.

Inflorescence cymose-paniculate, terminal or in the upper axils of the leaves, more or less regularly dichotomous, about equaling the leaves, the cymes many-

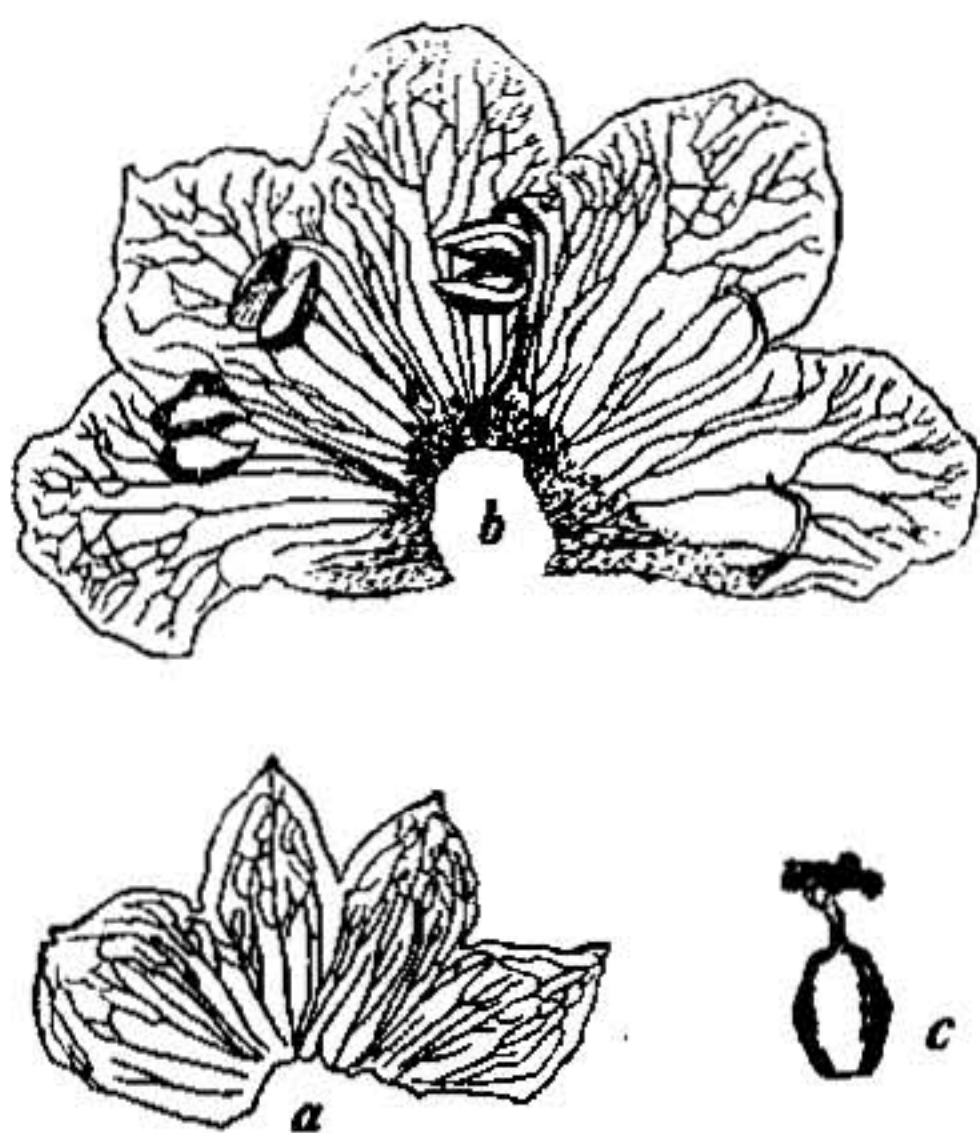


FIG. 101. — Floral detail of *Cordia eriostigma*. a, Calyx spread out; b, corolla spread out; c, pistil. Scale 2.



flowered, sparsely pilosulous before anthesis. Floral pedicels slender, 1 mm. long or less. Calyx tubular-campanulate, obsoletely 10-sulcate, about 5.5 mm. long, scarious, 3-lobulate at the apex, the lobules ovate-apiculate, one of them often 2-denticulate. Corolla white, the tube about 5.5 mm. long, broadening to the apex, the lobes 5, ovate-rounded, wide apart, reflexed. Stamens inserted near the corolla throat, exserted, the filaments villous at the base, the anther cells ovoid, broadly parted at the base. Pistil 5.5 mm. long, the ovary globose, the style first 2-branched, the branches bifid, each of the ultimate divisions ending in a clavate stigma.

Drupe not seen.

Type in the U. S. National Herbarium, no. 715984, collected in flower in open forest around Garachiné, southern Darién, Panama, February 12, 1912, by H. Pittier (no. 5694).

A member of the group of *Cordia nitida* Vahl, differing from that species in the shape of the leaves, the scarious, glabrous, and 3-lobulate calyx, the texture of the corolla, and the length of the stamens.

*Cordia trichostyla* Pittier, sp. nov.

FIGURE 102.

Section Myxa, subsection Laxiflorae. A small tree, 6 to 8 meters high, the branchlets terete, at first fuliginous-hairy, later glabrous.

Leaves coriaceous, the petioles broadly sulcate above, carinate beneath, 6 to 7 mm. long, fuliginous-hairy, the blades ovate or oblong, broader and rounded at the base, acute-acuminate at the apex, 10 to 18 cm. long, 4 to 7.5 cm. broad, scabrid above and dark green, the costa and veins subimpressed and ferruginous-pubescent, beneath paler, pubescent, reticulate, the costa and veins prominent.

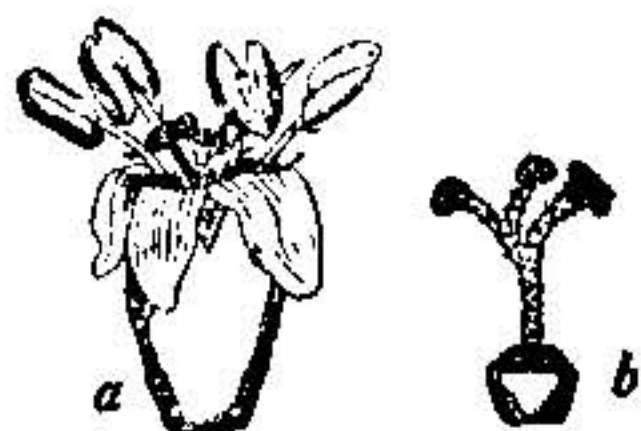


FIG. 102. — (a) Flower and (b) pistil of *Cordia trichostyla*. Scale 2.

Inflorescences terminal, cymose-paniculate, few-flowered, the rachis fuliginous-hairy. Flowers sessile; calyx tubular, attenuate to the base, about 5 mm. long, minutely pubescent without, 5-toothed, the teeth deltoid, about 1.2 mm. long; corolla white, tubular, narrow, deeply 5-lobulate, glabrous, the tube 4.5 to 5 mm. long, the lobes oblong, obtuse, reflexed, about 2.5 mm. long, 1.5 mm. broad; stamens 5, inserted about 1 mm. below

the apex of the interlobular sinus, long-exserted, the filaments densely setulose at the base, sparsely so to the apex, the anthers broad, with divaricate cells; ovary globose, minutely pubescent; style sparsely setulose, 3.5 to 4 mm. long, twice dichotomous, the ultimate branches each ending in a large, glabrous, rounded-depressed stigma.

Drupe globose, red.

Type in the U. S. National Herbarium, no. 472845, collected near Secanquim, Alta Verapaz, Guatemala, at an altitude of about 550 meters, in blossom, April 30, 1905, by H. Pittier (no. 189).

*Cordia acuta* Pittier, sp. nov.

FIGURE 103.

Section Myxa, subsection Spiciformes. A shrub, the branchlets subangulate, densely ferruginous-hairy.

Leaves subcoriaceous, the petioles canaliculate, 0.8 to 2.2 cm. long, ferruginous-tomentose, the blades ovate to ovate-elliptic, broadly cuneate at the base, acute at the apex, 6 to 14 cm. long, 2 to 5.5 cm. broad, dark green, impressed-reticulate and scabrous above, elevated-reticulate and softly hairy beneath, the costa and veins impressed above, prominent and ferruginous-tomentose beneath.

Floral spikes axillary, simple, few-flowered, and interrupted, the rachis angulate, ferruginous-hairy, up to 16 cm. long, free to the base (i. e. not adnate to the petiole). Flowers sessile; calyx broadly tubular-campanulate, about 3.5



mm. long, 5-toothed, sparsely villous-puberulous without, the teeth irregularly triangular, subacute, barbellate at the tip; corolla white, tubular, slightly widening to the apex, about 5 mm. long, irregularly sinuate on the margin, glabrous without, inside with a narrow hairy puberulous belt below the insertion of the stamens; stamens 5, glabrous, inserted at the middle of the corolla, included, the filaments slender, 1.7 to 1.9 mm. long, the anthers ovate; ovary depressed-globose, about 1.2 mm. in diameter; style about 2 mm. long, twice dichotomous, the stigmas clavate.

Drupe not seen.

Type in the U. S. National Herbarium, no. 530995, collected in old clearings at La Manuelita near Palmira, Cauca Valley, Colombia, altitude 1,100 to 1,300 meters, flowers, December 18, 1905, by H. Pittier (no. 808).

This belongs near *Cordia riparia* H. B. K. and *C. aubletii* DC., but differs in the size and pubescence of the flowers and in having the floral spikes free to the base, as well as in the size, shape, and indument of the leaves.

***Cordia chepensis* Pittier, sp. nov.**

Section Myxa, subsection Spiciformes. A shrub, 1 to 2 meters high, the bark brownish, puberulous on the young growth.

Leaves coriaceous, entire, the petioles sulcate, puberulous, about 5 mm. long, the blades ovate-oblong, 5 to 8 cm. long, 2 to 3 cm. broad, acute-attenuate at the base, subacute or obtuse at the apex, scabrous above, the costa and veins immersed, beneath reticulate, softly hairy, the costa and veins prominent.

Inflorescence spiciform, terminal, simple, the rachis tomentose-puberulous, 6 to 10 cm. long. Flowers sessile; calyx tubular, about 3.5 mm. long, puberulous, 4-toothed, the teeth short, broadly acute-triangular; corolla white, tubular, minutely puberulous, densely brownish-hairy inside at the insertion of the stamens, the tube 5 mm. long, the lobes 5, broadly rounded, reflexed; stamens inserted a little above the middle of the corolla tube, exserted, the filaments glabrous, 1.2 to 1.5 mm. long, the anthers ovate; ovary obconical, glabrous; style 4-fid, each branch ending in a clavate stigma.

Drupe not seen.

Type in the U. S. National Herbarium, no. 679672, collected in flower, in the bushy margins of the savannas of Chepo, Panama, October 8, 1911, by H. Pittier (no. 4511).

Related to *Cordia cylindrostachya*, but differing in its broader, entire leaves, its larger flowers with a 5-toothed calyx, its exserted stamens, etc.

***Cordia littoralis* Pittier, sp. nov.**

FIGURE 104.

Section Myxa, subsection Spiciformes. A bushy shrub, about 2 meters high, the young branchlets brownish, glandular-puberulous.

Leaves submembranous, entire, the petioles thick, sulcate, 7 to 8 mm. long, puberulous, the blades ovate-lanceolate, 9 to 14 cm. long, 4 to 7 cm. broad, rounded-attenuate at the base, acute at the apex, rough, more or less puberulous, and finely impressed-reticulate above, beneath pubescent, reticulate, the venation prominent.

Inflorescence spicate, simple, terminal, the rachis tomentose-puberulous, 9 cm. long. Flowers sessile;



FIG. 104.—(a) Flower and (b) pistil of *Cordia littoralis*. Scale 2.

calyx tubular, broad, contracted at the base, about 3.5 mm. long, 5-toothed, minutely puberulous without, the teeth irregular; corolla white, broad, tubular,

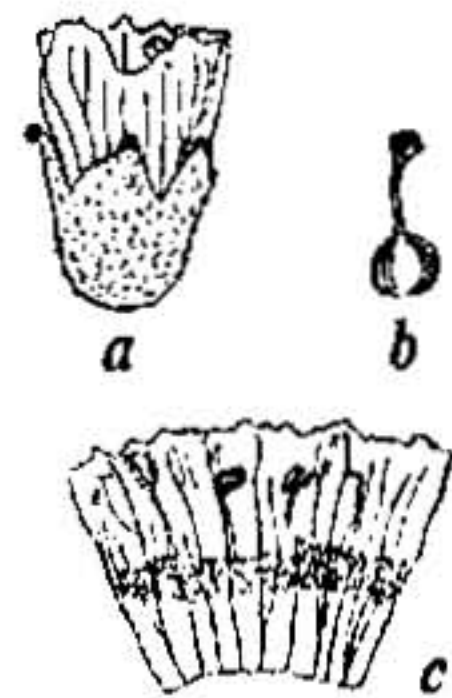


FIG. 103.—Flower and detail of *Cordia acuta*. a, Flower; b, pistil; c, corolla spread out. Scale 2.



glabrescent without, densely hairy within below the insertion of the stamens, the tube about 5 mm. long, the 5 lobes shallow, broadly rounded, reflexed; stamens inserted above the middle of the corolla tube, glabrous, exserted, the filaments slender, the anthers ovate; ovary subglobose, subglabrous; style slender, 4-fid, the stigmas subfusiform, acute at the apex.

Drupe not seen.

Type in the U. S. National Herbarium, no. 678699, collected on the strand near Port Limón, Costa Rica, in flower, May 27, 1911, by H. Pittier (no. 3641).

A species near *Cordia peruviana*, but easily distinguished by the shape, texture, and indument of the leaves and the characters of the flowers.

***Cordia mollis* Pittier, sp. nov.**

Section Myxa, subsection Spiciformes. A shrub, the branchlets terete, sparsely lenticellate, at first villous-tomentose, later glabrescent.

Leaves subcoriaceous, the petioles canaliculate, tomentose, about 6 mm. long, the blades narrowly elliptic, acute-attenuate at the base, acute at the apex, 4 to 7 cm. long, 1 to 2.2 cm. broad, dark green above, tomentose, muriculate, the costa and veins impressed, canescent-tomentose beneath, the costa and veins subprominent and ferruginous-pubescent; margin irregularly serrate.

Inflorescence spicate, simple or subramose, terminal, the rachis tomentose, the peduncular part 6 to 7 cm. long, the spike usually compact and not interrupted. Flowers sessile; calyx tubular-campanulate, about 3 mm. long, 5-toothed, hairy without, the teeth deltoid, acute; corolla white, tubular, irregularly lobulate, glabrous without, hairy within below the insertion of the stamens, the tube about 4 mm. long, the lobes 1 to 1.5 mm. long, 1 mm. broad, rounded, with an irregularly sinuate margin; stamens very short (not over 1.5 mm. long), glabrous, inserted near the apex of the tube, exserted half their length; filaments slender; anthers ovate; ovary obpyriform, about 1.5 mm. long, glabrous; pistil glabrous, 3 to 3.5 mm. long, twice dichotomous, the ultimate divisions ending each in a clavate stigma.

Drupe not seen.

Type in the U. S. National Herbarium, no. 472788, collected between Chiquín and Trapiche Grande, on the road from Guatemala City to Salamá, Guatemala, at an altitude of about 900 meters, in flower, April 19, 1905, by H. Pittier (no. 134).

Closely related to *Cordia cylindrostachya* Roem. & Schult., but differing in the tomentose leaves, as well as in the long style and in other details of the flowers.

## VERBENACEAE.

### A SUBSTITUTE FOR A PREOCCUPIED NAME.

***Citharexylum macrochlamys* Pittier, nom. nov.**

*Citharexylum macranthum* Pittier, Contr. U. S. Nat. Herb. 18: 169. 1916, not von Hayek, Bot. Jahrb. Engler 42: 170. 1908.

Through an unfortunate oversight, the specific name "*macranthum*" was applied by me to a Panama tree, although already used by von Hayek to designate a Peruvian species.

## BIGNONIACEAE.

### FOUR NEW SPECIES OF ADENOCALYMNA.

***Adenocalymna anomalum* Pittier, sp. nov.**

An erect shrub or small tree, the bark gray, rimose, the newer growth lenticellate and more or less pilosulous.



Leaves bipinnate, the main rachis about 34 cm. long, terete, sparsely lenticellate, pilosulous, with large, swollen nodes; pinnæ 4-jugate, the rachis terete and pilosulous, with swollen nodes, the first pair 5-folliolate, its rachis about 10 cm. long, the second pair 3-folliolate, the rachis 7 cm. long, the third pair with one leaflet articulate on a rachis 1.3 cm. long, the single leaflets of the upper pair inserted directly on the main rachis; leaflets coriaceous, glabrous, articulate, the petiolules flat or shallow-sulcate above, 0.7 to 1.2 cm. long in the lateral leaflets, about 4 cm. in the terminal ones, the blades ovate-elliptic, acute at the base, with a swollen joint, acuminate at the apex, 10 to 16 cm. long, 3.5 to 8 cm. broad, paler and finely reticulate with prominent venation beneath; prophyllum stipulaceous, obovate-spatulate, glandular, 6 to 7 mm. long.

Inflorescence racemose, axillary, bracteate, growing from the old wood; racemes about 8 cm. long, the rachis thick, grayish-pubescent; bracts geminate, ovate-lanceolate, 1.5 cm. long, 0.6 cm. broad, sparsely hairy on both faces; pedicel thick, about 1 cm. long; bractlets geminate, ovate, conchoid, clasping, obtuse and often slightly emarginate at the apex, 2.5 cm. long, nearly 2 cm. broad when flattened; calyx tubular-campanulate, 1.2 to 2 cm. long, irregularly lobulate, open to the base on one side(?), glandular along the upper margin, minutely pilosulous without; corolla about 4.5 cm. long, funnelform-campanulate, yellow, glabrous without, hairy inside at the insertion of the stamens, the basal tube broad, about 7 mm. long, the lobes not seen; stamens didynamous, glabrous, the filaments incurved, 2.4 and 3.4 cm. long (the longer stamens reaching the base of the lobes), the anther cells divaricate, ovoid, 4 mm. long; staminode 5.5 mm. long, glabrous, spatulate at the apex; disc pulvinate, thick, 1.3 to 1.5 mm. high; pistil about 3 cm. long, the ovary elongate, slender, thicker at the apex, sparsely scaly, about 4.5 mm. long.

Fruit not known.

Type in the U. S. National Herbarium, no. 601679, collected on the Guinand Estate (Cárdenas), Siquire Valley, State of Miranda, Venezuela, in open meadows, flowers, March 19, 1913, by H. Pittier (no. 5963).

The specimens at hand are, unfortunately, scanty and not very complete, but the species evidently belongs to the *Euadenocalymnae* near *A. comosum* DC., differing from all other representatives of the genus in the compound leaves with very prominent articulations.

***Adenocalymna cocleense* Pittier, sp. nov.**

An erect, deciduous shrub, "the stems 5 cm. in diameter or more" (Williams in sched.), the young branchlets 4-angular, densely furfuraceous-tomentose.

Upper leaves all 3-folliolate, appearing with the flowers, the petioles terete, subsulcate, densely furfuraceous-tomentellous, 4.5 to 7.5 cm. long; petiolules canaliculate, furfuraceous-tomentellous, the middle one 1.5 to 2 cm., the lateral ones 0.7 to 1 cm. long; leaflet blades broadly ovate, rounded at the base, acute or subacuminate and mucronulate at the apex, 6 to 7.5 cm. long, 4 to 5.5 cm. broad, sparsely covered on both faces with short, branched hairs, the costa and veins more densely hairy; stipule-like phylla scarious, broadly triangular-acute, pubescent, about 3 mm. long.

Inflorescence terminal, short, the rachis, peduncles, and pedicels furfuraceous-tomentellous; bracts linear, boat-shaped, tomentellous without, glabrous within, up to 7 mm. long, early deciduous; bractlets inserted at the base of, and nearly as long as or longer than the pedicels, these about 6 mm. long; calyx tubular-campanulate, 7.5 mm. long, 5-toothed, furfuraceous-tomentellous without, eglandular, the margin ciliate, the teeth narrow, mucronate, wide apart; corolla straight, tubular-funnelform, pink within, whitish at the base, 4.7 to 5 cm. long, furfuraceous-tomentellous without, glabrous within except at the



insertion of the stamens, the lobes broadly ovate, obtuse, imbricate in the bud; stamens didynamous, glabrous, the filaments 11 and 14.5 mm. long, the anther cells divaricate, elongate, 3.5 mm. long; disc cupuliform, about 1 mm. high; pistil 2.7 cm. long; ovary ovoid, about 2 mm. long, minutely pubescent; style scaly at the base; stigma lobes oblong, obtuse or acute.

Capsule not known.

Type in the U. S. National Herbarium, no. 678125, collected in the vicinity of Penonomé, Province of Coclé, Panama, flowers, February 23 to March 22, 1908, by R. S. Williams (no. 522).

***Adenocalymna flos-ardeae* Pittier, sp. nov.**

A vine; young branchlets terete, striate, scaly-canescens.

Upper leaves submembranous, the leaflets conjugate; petioles and petiolules grayish scaly-pubescent, the former terete, 3 cm. long, the latter narrowly canaliculate, 2 to 3 cm. long; leaflet blades ovate-oblong, oblique, truncate or subemarginate and rounded at the base, obtuse, acute, or short-acuminate at the apex, 7 to 12 cm. long, 3.5 to 7 cm. broad, pilosulous on the costa, veins, and venules above, beneath prominently veined, reticulate, pubescent on the costa and veins, pilosulous on the venules, 5-veined at the base.

Inflorescences axillary, racemose, the peduncles up to 2 cm. long, scaly-pubescent, often with a small leaf at the base of the raceme, the racemes very short, few-flowered; bracts and bractlets linear, brownish-tomentellous, 3 to 5 mm. long; pedicels slender, 5 to 7 mm. long, furfuraceous-hairy; calyx narrowly campanulate, 5-lobulate, 9 mm. long, valvate in estivation, tomentellous-pubescent without, glabrous within; corolla tubular-funnelform, about 4 cm. long, yellowish white, minutely and sparsely scaly-pubescent without and on the inside of the lobes, glandular-hairy at the insertion of the stamens within, the narrow basal tube about 1 cm. long, the lobes short and rounded; stamens didynamous, glabrous, the filaments about 12 and 14 mm. long, the anther cells divaricate, 2.5 to 3 mm. long; staminode glabrous, short; disc pulvinate, about 1 mm. high; pistil about 35 mm. long, the ovary oblong, 1.5 to 2 mm. long, 2-sulcate, scaly, the ovules numerous, 2-seriate in each cell; style glabrous; stigma lobes lanceolate.

Capsule not seen.

Type in the U. S. National Herbarium, no. 678976, collected along Río Fató, Province of Colón, Panama, in thickets, flowers, July 9, 1911, by H. Pittier (no. 3898).

Known among the natives as "bejuco de garza." This species apparently belongs to section *Hanburyophyton* Bur. & Schum., near *A. laevigatum* and *A. asperulum* Bur. & Schum., both from southern Brazil.

***Adenocalymna hosmeca* Pittier, sp. nov.**

A vine, the bark grayish, the young branchlets herbaceous, glabrous.

Upper leaves submembranous, glabrous, the petioles terete, 2.4 to 2.8 cm. long; leaflets conjugate, the petiolules 1.8 to 2 cm. long, flattened above, the blades ovate, broadly rounded at the base, subacuminate and obtuse at the apex, 6 to 9.5 cm. long, 5 to 6.5 cm. broad, reticulate; tendrils slender, 3-fid at the apex, usually caducous but sometimes persistent, thickened and ligneous, then branchless at the end.

Inflorescences axillary, paniculate, bearing a leaf at the base, the rachis trichotomous, glabrous; floral pedicels articulate, 0.5 to 1 cm. long, bearing at the base 2 minute, hairy bractlets; calyx tubular, 8 mm. long or less, truncate, minutely and sparsely stellate, the margin ciliate, bearing 5 minute, remote teeth; corolla funnelform, 4.3 cm. long, pinkish white at the base, purplish on the lobes, glabrous without, glandular-pubescent within at the insertion of the



stamens, the lobes broadly rounded and acuminate; stamens didynamous, the filaments glabrous, 1.3 and 2 cm. long, the anther cells divaricate, about 3.5 mm. long, minutely hairy; staminode filiform, short, circinate at the apex; disc thick, 1.5 to 2 mm. high; style about 3 cm. long, the ovary elongate, compressed, 5 mm. long, carinate on the faces, densely scaly; style filiform; stigma lobes broadly lanceolate.

Fruit not known.

Type in the U. S. National Herbarium, no. 861399, collected between Cangel and El Corozal, Guanacaste, Costa Rica, flowers, February, 1912, by Otón Jiménez (no. 374).

Collected also near Nicoya, Costa Rica, in thickets, flowers, February, 1900, by A. Tonduz (Inst. Fís. Geogr. Costa Rica, no. 13830).

This species, which emits a strong odor of garlic, also belongs to the section *Hanburyophyton*, but comes close to *A. alliaceum* Miers. "Hosmeca" is the native name.

#### NEW SPECIES OF SEVERAL GENERA.

*Clytostoma isthmicum* Pittier, sp. nov.

PLATE 106.

A vine with slender stems, the new branchlets subquadrangular, striate, more or less puberulous.

Leaves conjugate, the petioles subterete, more or less distinctly canaliculate, 1 to 2.5 cm. long; leaflets coriaceous, the petiolules canaliculate, 1 to 1.5 cm. long, sometimes puberulous, the blades ovate, oblong, or elliptic, acute at the base, more or less abruptly acuminate at the apex, 7 to 15 cm. long, 3 to 6.5 cm. broad, reticulate and sparsely scaly on both faces, paler beneath; tendrils very slender.

Inflorescences axillary or terminal, the flowers long-pedicellate, 1 to 4 in the cluster; peduncle subangular, 1.5 to 2 cm. long, provided near the base with a pair of lanceolate, acute bracts 3 to 4 mm. long; pedicels slender, 1 to 2 cm. long, minutely pilosulous toward the apex, provided at the base with 2 ovate, acute bractlets about 2 mm. long, and sometimes a second pair of setaceous, pilosulous bractlets; calyx cupuliform, truncate, minutely 5-toothed, about 4.5 mm. long, sparsely glandular below the teeth, ciliolate on the margin, very sparsely scaly; corolla tubular-campanulate, 5 to 6 cm. long, pale pink, sparsely scaly without, the 5 lobes broad and rounded-ovate; stamens didynamous, included, the longer ones about 1.6 cm. long, inserted on the tube about 6 mm. from its base; staminode filiform; anther cells about 2.7 mm. long, minutely pilosulous; disk very low (about 0.5 mm. high), crenulate; pistil about 32 mm. long, the ovary sessile, compressed-ovoid, 2 mm. long, densely muriculate, the ovules numerous, 2-seriate in each cell.

Capsule subdiscoid, 5 cm. long, 4.5 cm. broad, 2.2 cm. thick, echinate, the prickles 7 to 9 mm. long, the valves convex, divided at base and apex, the peduncle stout, 1.5 cm. long; seeds suborbicular, 1.7 cm. long, 2 cm. broad, including the coriaceous wings.

Type in the U. S. National Herbarium, no. 679092, collected along the Trinidad River, Canal Zone, Panama, near sea level, among bushes, flowers and fruits, July 19, 1911, by H. Pittier (no. 4008).

#### OTHER COLLECTIONS:

PANAMA: Marragantí, southern Darién, fruits, April 9, 1908, *Williams* 690.

Along Chagres River, from Juan Mina to El Vigía, common among bushes, flowers, May 11 to 14, 1911, *Pittier* 3452. Around Pinogana, southern Darién, in clearings, flowers, April 16, 1914, *Pittier* 6526.



This new species belongs to a genus considered heretofore to be confined to Brazil and the territory southward, with the exception of *C. noterophilum* Bur. & Schum., reported from French Guiana.

EXPLANATION OF PLATE 106.—Fruit of *Olytostoma isthmium*. Natural size.

***Lundia puberula* Pittier, sp. nov.**

A vine, the young branchlets puberulous, sparsely covered with elliptic, brownish lenticels.

Leaves conjugate; petioles and petiolules terete, puberulous, the former 2 to 2.5 cm. long, the latter canaliculate, 1.5 to 2 cm. long; leaflet blades ovate-acuminate at the apex, oblique, rounded-emarginate at the base, 6 to 9 cm. long, 2.5 to 5 cm. broad, reticulate, glabrous, and almost lustrous above, paler beneath, finely reticulate, the costa and veins puberulous and barbate in the axils.

Inflorescence paniculate, terminal, many-flowered, the rachis puberulous; bracts narrow, acute, pubescent, about 1 mm. long; flowers clustered at the ends of the peduncles, these 0.8 to 2.5 cm. long; bractlets linear, pubescent, about 2 mm. long, caducous; pedicels minutely puberulous, 4 to 5 mm. long; calyx tubular, truncate, about 5 mm. long, minutely puberulous without, sometimes split laterally; corolla about 3.5 cm. long, pinkish purple, pubescent without, glabrous within, the narrow basal tube 1 cm. long, the lobes rounded-obtuse; stamens inserted at the upper end of the basal tube, included, the filaments 9.5 and 14.5 mm. long, the anther cells divaricate, subfalcate, long-ciliate, 2.3 to 2.8 mm. long; staminode obsolete; disc none; pistil about 2.8 cm. long, the ovary ovoid-oblong, 2 mm. long, minutely white-tomentose, the style smooth, the stigma lobes narrow.

Fruit not known.

Type in the U. S. National Herbarium, no. 715745, collected at La Palma, southern Darién, Panama, flowers, January 26, 1912, by H. Pittier (no. 5499). The species is apparently common in old clearings.

This belongs in the section *Eulundia* Schum., near *Lundia obliqua* Sond., from which it differs in its conjugate leaflets, glabrous on the upper face, eglandular at the base, its many-flowered panicles, its anther cells closely ciliate along the line of dehiscence, etc.

***Jacaranda caucana* Pittier, sp. nov.**

A middle-sized, deciduous tree, the trunk erect, the crown elongate; young branchlets minutely puberulous.

Leaves unequally twice pinnate, the main rachis 8.5 to 20 cm. long, narrowly canaliculate, minutely hairy, the rachis of the pinnæ 1.5 to 5 cm. long, semi-terete, broadly canaliculate, minutely hairy; leaflets 7 to 20-jugate, subopposite or alternate, sessile, ovate-oblong, rounded and very oblique at the base, subacute at the apex, sparsely villous above, paler and more densely villous or subtomentose beneath, the 4 pairs of veins strongly impressed on the upper face of the blade, slightly prominent on the lower face, the margin revolute; terminal leaflet 7 to 10 mm. long, 3 mm. broad; lateral leaflets 4 to 6 mm. long, 1.5 to 2 mm. broad.

Panicles terminal, their main branches about 15 cm. long, the rachis and pedicels minutely puberulous; branchlets dichotomous; bractlets very small, triangular-acute; pedicels 2 to 4 mm. long; calyx broadly cupuliform, about 3 mm. long, minutely pubescent, distinctly 5-toothed; corolla funnelform-campanulate, subzygomorphic, about 4 cm. long, blue, glabrous without except for sparse white hairs near the apex, hairy within on the veins and glandular-hairy at the insertion of the stamens, the tube swollen at the base and then contracted and curved, the lobes broad and rounded; stamens equally inserted in



the corolla tube, included, about 1 cm. long, the filaments arcuate, glabrous, the anther cell ovate-acuminate; staminode about 22 mm. long, glabrous at the base, then long glandular villous to the thick clavate apex; disc cupuliform, thin, glabrous; ovary sessile, ovate, about 3 mm. long, densely white-tomentose; style glabrous, about 18 mm. long, the lobes of the stigma ovate-oblong.

Capsule depressed-ovoid, substipitate at the base, obtuse or emarginate at the apex, 7 cm. long, 5 to 5.5 cm. broad, about 2 cm. thick, the valves woody, glabrous, sparsely dotted with whitish glands, sinuate on the margin; seeds brownish, rough on the surface, 1 cm. long, 3.2 cm. broad, including the hyaline wings.

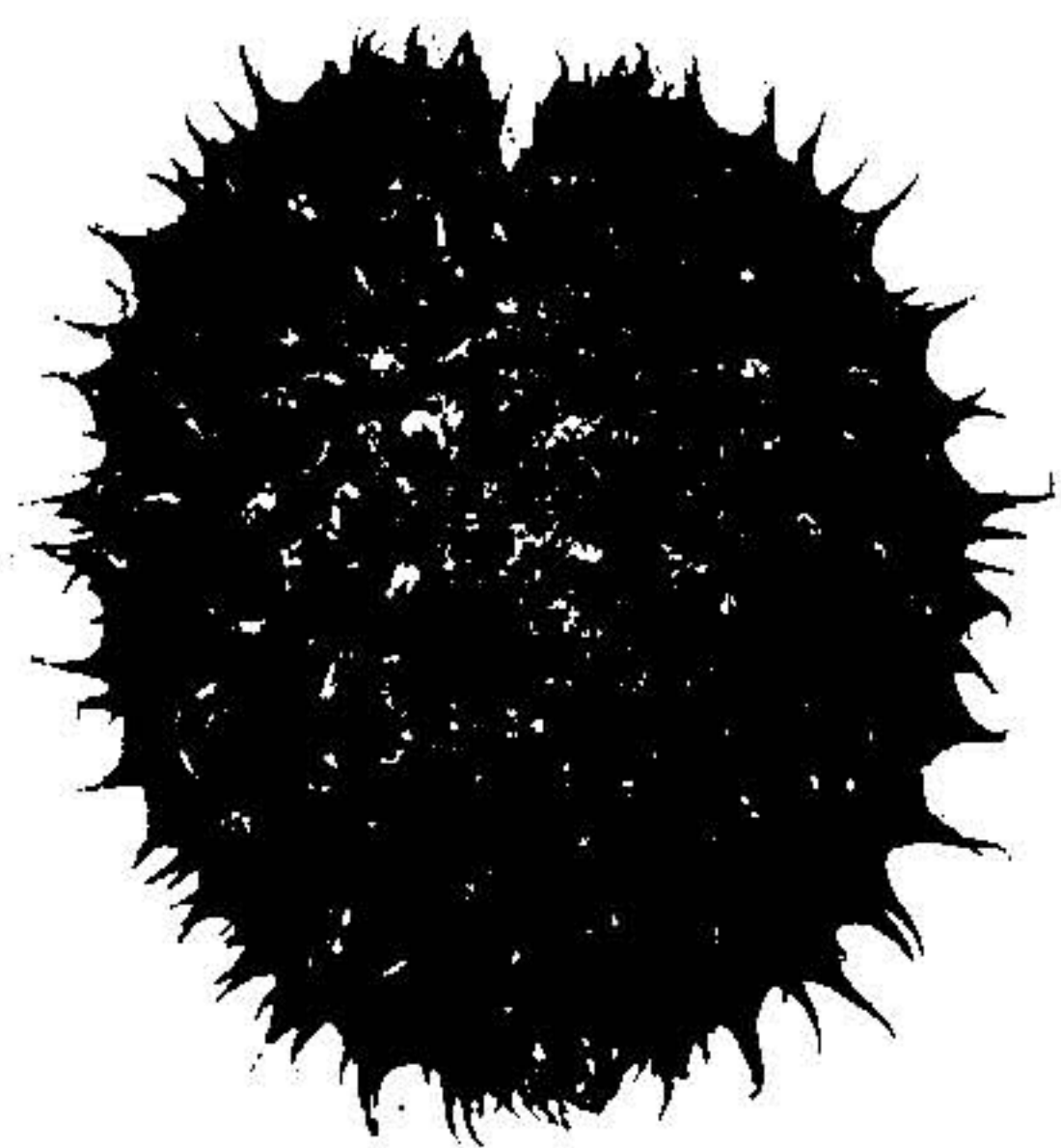
Type in the U. S. National Herbarium, no. 531119, collected in a garden at Cali, Cauca, Colombia, flowers and fruits, January 1, 1906, by H. Pittier (no. 925).

By the tomentose ovary this is brought near *J. lasiogyne* Bur. & Schum., but it differs in the villous leaflets, the narrower rachis of the pinnæ, and the shape and size of the fruit. It has also the inflated base of the corolla found in that species and in *J. filicifolia*, with which latter it can not be confused.

*Jacaranda caucana* is a favorite with the natives of the Cauca Valley, on account of its beautiful blue flowers. They call it "gualandai." The specimens in the U. S. National Herbarium were collected in a garden, but the tree was said to grow wild in the district surrounding Cali. In the Flora de Colombia, by S. Cortés, we find mentioned on page 99 a *Jacaranda gualanday*, from Cundinamarca, given as synonym of *J. mimosifolia* D. Don. There is, however, nothing to indicate that the species is the same as the one from Cali, since no description is given. Furthermore, *J. mimosifolia* is but another name for *J. acutifolia*, which is quite distinct from *J. caucana*. If then *J. gualanday* Cortés, a hyponym, is really a synonym of *J. mimosifolia*, it has no standing, and besides it would not apply to the Cauca tree.

*Jacaranda caucana* probably blossoms twice in the year. At the time of my visit in the Cauca Valley there was only a scanty flowering, and it was said that the time to see the trees in their full glory was about July or August. In July they drop their leaves, and the flowers immediately follow.





FRUIT OF CLYTOSTOMA ISTHMICUM PITTIER.