



SMITHSONIAN INSTITUTION  
UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 13, PART 4

NEW OR NOTEWORTHY PLANTS FROM  
COLOMBIA AND CENTRAL  
AMERICA—2

By HENRY PITTIER



WASHINGTON  
GOVERNMENT PRINTING OFFICE

1910



con recuerdos y muestras del nuevo  
especie de *H. Pittier.*

SMITHSONIAN INSTITUTION  
UNITED STATES NATIONAL MUSEUM

## CONTRIBUTIONS

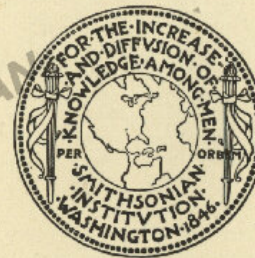
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PREFACE.

This paper is the second number of the series, by Henry Pittier, entitled *New and Noteworthy Plants from Colombia and Central America*, the first having been published in Volume 12 of the *Contributions from the United States National Herbarium*, pages 171 to 181. It consists chiefly of descriptions of new and little known species of *Asclepiadaceae* and *Cucurbitaceae*, keys to the species of several genera, and the characterization of two new genera, *Frantzia* and *Polakowskia*, from Costa Rica.

FREDERICK V. COVILLE,  
*Curator of the United States National Herbarium.*

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## NEW OR NOTEWORTHY PLANTS FROM COLOMBIA AND CENTRAL AMERICA—2.

By HENRY PITTIER.

### MAGNOLIACEAE.

#### THE COSTA RICAN SPECIES OF TALAUMA.

The genus *Talauma* is represented in Costa Rica by two species, one of which grows at the lower edge of the "tierra templada," while the other is conspicuous among the larger trees of the upper forest belt on the volcanoes Barba and Poás. Heretofore the last species has been considered identical with *T. cespicesii* of Central Colombia, a view that is not tenable, for reasons which are stated below.

*Talauma poasana* Pittier, sp. nov.

Medium-sized tree. Young twigs glabrous, regularly marked by the circular scars of the caducous stipules.

Leaves coriaceous, glabrous, petiolate. Petioles 3 to 3.5 cm. long, canaliculate, rather slender. Leaf blades 10 to 14 cm. long, 5 to 6 cm. broad, acute at base, with a more or less rounded acumen, light green and glossy above, whitish green and finely reticulate beneath. Margin very entire, slightly revolute.

Pedicels 6 cm. long from bract to perianth. Perianth formed of 9 thick, coriaceous divisions, the 3 exterior ones (sepals) larger, about 6 cm. long by 2 cm. broad, elliptic-ovate, greenish and callose on the back, cream white with purplish tinges inside, the interior ones obovate-spathulate and conchiform, of the same length as the former but narrower and entirely cream white. Stamens numerous; anthers sessile, about 12 mm. long, introrse. Carpels numerous, fusiform, and forming a strobiliiform gynœcium. Ovary 2-ovulate; style dorsi-sulcate, ending in an obtuse reflexed tip.

Fruits and seeds unknown.

COSTA RICA: Rancho Flores, altitude 2,050 meters, at the foot of the Barba Volcano, Pittier, flowers, May, 1888; Tonduz, flowers, February, 1890 (Instituto fis-geog. Costa Rica nos. 269, 2144); El Achiote, Poás Volcano, 2,240 meters, Pittier, flowers, July, 1888 (Instituto fis-geog. Costa Rica no. 328); La Quesera, Poás Volcano, 2,300 meters, Pittier 2043, March 31, 1907 (U. S. National Herbarium no. 578441, type).

Mr. Donnell Smith considers this species the same as *Talauma cespicesii* Triana & Planch., a large tree reported from the Colombian province of Bogotá. Of the latter, there are no specimens extant in any collection, and the authors based their incomplete diagnosis on Doctor Cespices's original and probably untechnical description published about 1840 in Bogotá, on a loose sheet, in which the plant received the generic name of *Santanderia*, from one of the protagonists of the great South American Revolution. The few characters given in Triana and Planchon's Memoir, then, are not at all reliable and, moreover, they agree very imperfectly with the above description of the Costa Rican specimens. For these reasons I prefer to give a new name to our species and to leave it for future explorers to find again Cespices's tree, so



as to make possible a new and complete description, that will confirm one or other of the opposed opinions entertained by my excellent friend Capt. Donnell Smith and myself.

**Talauma gloriensis** Pittier, sp. nov.

A middle-sized forest tree.

Leaves very variable in size, coriaceous, entire, glabrous. Petioles 2 to 4 cm. long, rounded beneath, flattened above and bordered by 2 whitish, callose lines, closing together at the blade. Leaf blades more or less broadly elliptic-lanceolate, briefly attenuate at base, acute or rounded at tip, 10 to 25 cm. long, 4 to 10 cm. broad, paler beneath, the elegantly reticulate venation prominent on both sides. Stipules deciduous, about 2.5 cm. long, papillose and dark brown on the outer side, smooth inside, with a 3-fid end, the middle tip being longer, somewhat foliaceous, and subulate. Buds 4 cm. long, 3 cm. in diameter. Bracts 2, deciduous. Perianth formed of 9 coriaceous, greenish-white, thick divisions, the 3 exterior (sepals) ovate, short-acuminate, 4 cm. long, 3 cm. broad, the 6 interior (petals) ovate-elliptic, slightly narrower and attenuate at base. Stamens numerous; anthers almost sessile, linear, introrse. Carpels 30 to 36. Styles deciduous.

Fruit 4 to 5 cm. long, 3 to 3.5 cm. in diameter, the lignified, scale-like carpels measuring about 2 cm. in length and 7 to 8 mm. in breadth. Dehiscence irregular.

COSTA RICA: Reventazon Valley, shade tree in the coffee plantations at La Gloria, Pittier, flowers, January, 1902 (Instituto fis-geog. Costa Rica no. 16362; U. S. National Herbarium no. 579341, type); Cook & Doyle 390, flowers, April 26, 1902 (U. S. National Herbarium no. 474215); El Guayabo, altitude 1,000 meters, Ridgway 1908 (U. S. National Herbarium no. 579410).

**EUPHORBIACEAE.**

**CORRECTIONS AND ADDENDA TO "THE MEXICAN AND CENTRAL AMERICAN SPECIES OF SAPIUM."<sup>a</sup>**

In a very important, recently published<sup>b</sup> contribution to the knowledge of the genus *Sapium*, Mr. Hemsley introduced some changes affecting my own results as published in the Contributions. While my *S. sulciferum* is recognized as a good species, and is redescribed and excellently illustrated, *S. pleiostachys* Schum. & Pittier and *S. anadenum* Pittier are identified with each other and relegated to the synonymy of *S. jamaicense* Sw. With reference to the latter three forms, I regret to be unable to agree with the eminent botanist of Kew, even after a careful reexamination of the specimens. But at the same time, it is only fair to acknowledge that his adverse stand as to my new creations is partly justified by my own mistake in including Mr. Donnell Smith's specimen no. 2607, from Guatemala, as one of the types of *S. pleiostachys*, from which the characters of the capsule were drawn. As a matter of fact, our imperfect specimen of the Guatemalan plant compares satisfactorily with Wright's no. 578 from Cuba, and is doubtless *S. jamaicense* Sw., as stated by Mr. Hemsley.

Although it would have been desirable to obtain more complete data before giving a definite statement as to the real standing of the

<sup>a</sup> Contr. Nat. Herb. 12: 159-166, 1908.

<sup>b</sup> Hook. Icon. Pl. pl. 2876-2900, 1909.

two questioned species, I should be willing to abide by Mr. Hemsley's opinion in this particular and to consider *S. anadenum* a synonym of *S. pleiostachys*, but for the following considerations. In the first species the leaves are proportionately shorter and broader; the primary veins are more distant and the venation in general is more conspicuous on the lower face of the blades; the petiolar glands are almost always undeveloped; the petioles are broad with their margins turned up so as to form a deep channel on the upper side of the same, while in *S. pleiostachys* they are scarcely sulcate, a differential character that escaped my notice at first. Furthermore, after a new and careful investigation of the flowers, I have to confirm every detail in the descriptions given, and it will not weaken the case to add that while the last-named form grows almost at sea level on the semiarid coast of the Pacific, *S. anadenum* is a mountain tree, the specimens of which were collected in the damp forests (Regenwälder) of the Reventazon basin.

In a letter dated March 5, 1910, Mr. Hemsley says in part:

Mr. Tonduz has sent to Kew a small piece of "*Sapium anadenum*," and I now think it may be specifically distinct from *S. jamaicense*, but the material is insufficient for me to form a definite opinion.

I am confident that a further examination of complete specimens, which are unfortunately not available at present, would not only dispel all doubt of the specific value of *S. anadenum*, but would also satisfy as to the distinctive merits of *S. pleiostachys*. The difference between *S. jamaicense* and *S. pleiostachys* can be seen at a glance, even by one who is not an expert in descriptive botany. *S. pleiostachys* has very slender petioles and small, shiny leaf blades, and the midrib forms on the upper face a linear furrow (instead of a broad one as in the West Indian species). Setting aside the Guatemalan specimen, we find that the margin of the leaves is always entire or at the most obscurely sinuate; the primary veins are closer, more numerous, and less apparent. The floral spikes are mostly in clusters of 4, and there are from 6 to 8 flowers (and not 3) with each bract. As stated above, the description of the capsules should be eliminated, since the ones at hand were those of Donnell Smith no. 2607, wrongly included in the species by myself.

Only the following changes, then, need to be introduced into the nomenclature of *Sapium* within the scope of my former paper:

***Sapium jamaicense*** Sw. Adnot. Bot. 62. 1829.

Donnell Smith no. 2607. Capsules and leaves only.

***Sapium ruizii*** Hemsl. Hook. Icon. pl. 2894. 1909.

Mexico or Central America (Ruiz & Pavon).

***Sapium simile*** Hemsl. loc. cit. (text).

Central America (Ruiz & Pavon).

***Sapium macrocarpum*** Mueller Arg. Linnaea 32: 119. 1863.

*S. mexicanum* Hemsl. Hook. Icon. pl. 2630. 1901.



## ASCLEPIADACEAE.

## NEW OR INTERESTING SPECIES.

The study of these few species has brought to light the urgent necessity of a thorough revision of the representatives of the order in Central America.

*Philibertia reflexa* Pittier, sp. nov.

FIGURE 2.

A vine, almost entirely glabrous, with rounded, slender stems.

Leaves coriaceous, easily caducous. Petioles 10 to 14 mm. long, slender, sulcate. Leaf blades 3 to 5 cm. long, ovate, cordate, acutely long-acuminate, entirely smooth, deep green above, paler beneath.

Inflorescences cymose, pedunculate, umbel-like, bearing 30 flowers, often more. Peduncles 2 to 3 cm. long. Pedicels 2.5 to 3 cm. long, very slender, provided at the base with a common involucre of narrowly lanceolate, acute bracts, 5 to 10 mm. long. Lobes of calyx ovate, obtuse, 3 to 4 mm. long, 1.5 mm. broad, sparsely ciliate. Corolla

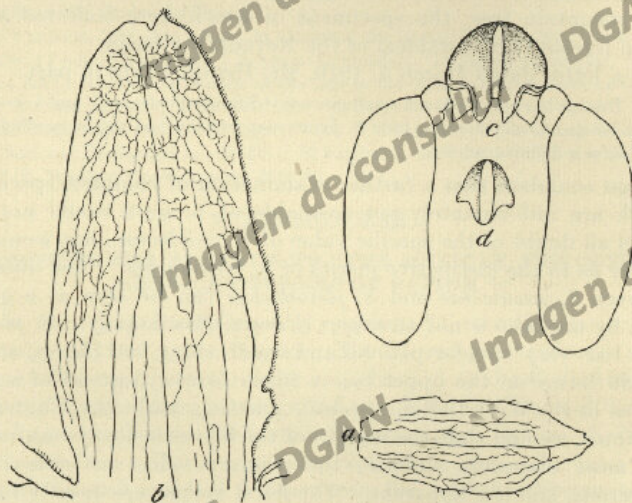


FIG. 2.—Flower parts of *Philibertia reflexa* and *P. odorata*. Of former, a, segment of calyx; b, lobe of corolla; c, translatorium. Of latter, d, retinacle. a, b, Scale 9; c, d, scale 32.

rotate, deeply incised, about 2 cm. in diameter; tube very short, slightly hairy inside; lobes oblong-lanceolate, rounded at tip, 7 to 8 mm. long, 3 to 4 mm. broad, ciliate on the right margin, all reflexed at anthesis. Outer corona annular, smooth, rather thin; scales of inner corona swollen, longer than the anthers. Retinacle broad, more or less heart-shaped, 0.5 mm. long and broad; arms short (0.2 mm.); pollinia oblong, subcylindrical, 1.16 mm. long, 0.42 mm. in diameter. Ovary glabrous; stigma slightly bifid. Follicles not known.

COSTA RICA: On bushes around Nicoya, Pittier, flowers, December, 1903 (U. S. National Herbarium no. 578558, type).

This species belongs to the same group (Cordatae) with *P. odorata* Hemsl., *P. pavoni* Hemsl., and a few others. Its nearest affinity appears to be with *P. odorata*, from which it differs by its being almost entirely glabrous, and by its larger flowers and translators. The reflexed position of the lobes of the corolla at the time of the anthesis seems to be also a good, constant character.

*Fischeria calycina* Decaisne in DC. Prodr. 8: 600. 1844.

FIGURE 3.

A milky vine. Stems and branchlets velvety-pubescent, and covered at the same time with somewhat sparse, long, stiff, brownish hairs.

Leaves petiolate, of a medium size. Petioles 4 to 5 cm. long, slender, pubescent, and with interspersed long hairs. Leaf blades 7 to 14 cm. long, 4 to 7 cm. broad, ovate, often contracted near the base, cordate, acuminate; upper face dark green and sparsely short-hairy; lower face velvety, pale, with the main nerves and veins forming a brown-colored salient, reticulate design.

Inflorescences axillary and racemose; flowers caducous. Peduncles 12 to 20 cm. long, 1 c., as long as the adjacent leaves, pubescent, with interspersed long stiff hairs,

the upper part covered with the scars of the fallen flowers. Pedicels 2.4 cm. long, slender, velvety like the branches, provided at the base with an acute, linear, hairy bractiole.

Lobes of calyx 4 to 5 mm. long, 1.8 to 2 mm. broad, lanceolate, subacute, hirsute, alternating with finger-like glands.

Corolla yellowish white, its lobes about 10 mm. long, 5 mm. broad, suddenly contracted and with plicate margin near the subacute end. Crown double, the exterior annular, the interior lobulate and adhering to the anthers. Retinacle subhastate, contracted at the base, 0.29 mm. long, 0.25 mm. in maximal breadth; caudicles about 0.15 mm. long; pollinia subreniform, 0.97 mm. long, the maximum transverse diameter 0.60 mm. Ovaries ovate, hairy, ending in an obtuse, glabrous style about 1 mm. long. Follicles not known.

COLOMBIA: Córdoba, at the outlet of the Dagua Valley, Pacific coastal zone, altitude 30 to 100 meters, Pittier 596, flowers, December 9, 1905 (U. S. National Herbarium no. 530783).

The identification of the species of this genus is extremely difficult and the group needs a thorough revision. Our Colombian specimens, as here described, agree better with Decaisne's description of *Fischeria calycina* than with that of any other of the West Andean forms.

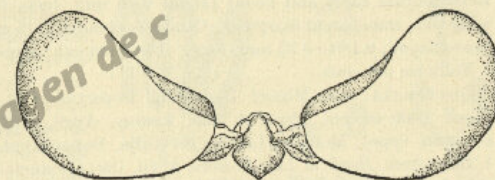


FIG. 3.—Translatorium of *Fischeria calycina*. Scale 32.



FIG. 4.—Flower parts of *Metastelma decipiens* and *M. barbigerum*. Of former, a, part of calyx; b, lobule of corolla; c, stamen, lateral view, showing scale of corona; d, anther, front view, showing apical appendage; e, translatorium. Of latter, f, translatorium. a-d, Scale 9; e, f, scale 32.

*Metastelma decipiens* Pittier, sp. nov.

FIGURE 4.

Subvoluble, trailing vine, the stems rather thick, divaricate, longitudinally striate, minutely pubescent. Fully developed internodes 6 cm. long.

Leaves rather large or middle-sized. Petioles about 5 mm. long, pubescent. Leaf blades 3 to 4 cm. long, 1 to 1.5 cm. broad, lanceolate, acuminate, rounded at base, glabrous or sparsely pubescent, blackish above and yellowish green below when dry, with one pair of conical glands near the insertion of the petiole; margin more or less revolute.



Cymes axillary or terminal, often compound, pedunculate, always shorter than the leaf; flowers numerous on each cyme, rather large. Peduncles thick and stiff, 5 to 15 mm. long, pubescent. Pedicels 3 to 4 mm. long, also minutely hairy. Calyx hairy outside, about 1.6 mm. long; lobules rounded-triangular, with a scarioso, ciliate margin. Corolla 3 to 3.5 mm. long, tubulose-campanulate, deeply parted, white inside, brownish outside; lobes lanceolate, 2.5 to 3 mm. long, acute, very hairy inside on the margin and tip, the center glabrous. Corona inserted near the middle of the stamens, the scales about 1 mm. long, 0.4 mm. broad at base, membranous, acutely triangular, not surpassing the tips of the apical membranes of the anthers. Stamens 2.2 mm. long, the apical membrane acutely ovate (0.55 mm. long, 0.45 mm. broad). Retinaculum short and broad (about 0.18 mm. long, 0.10 mm. broad), with thin, wing-like, transparent margins. Caudicles slender, 0.15 mm. long. Pollinia pendent, pear-shaped, 0.18 to 0.22 mm. long. Pistil smooth; styles about 1.2 mm. long.

Follicles not seen.

GUATEMALA: San Miguel Uspantán, Department of Quiché, at an altitude of about 2,000 meters, Heyde & Lux, flowers, April, 1892 (Donnell Smith Herbarium no. 3060, type); Mongoy, Laguna de Guija, Department of Jutiapa, at an altitude of 1,330 meters, Heyde & Lux, flowers, April, 1894 (Donnell Smith Herbarium no. 6348).

This species was first distributed under the name of *Metastelma pedunculare* Decaisne,<sup>a</sup> and then transferred to *M. barbigerum* Scheele.<sup>b</sup> The characteristics given by Decaisne for the first plant certainly do not apply to the specimens collected by Heyde and Lux, but neither do these agree with Scheele's description and the Lindheimer specimen in the National Herbarium. The stems and branchlets are rather thick and not glabrous, the cymes are not few (4 or 5)-flowered, the pedicels are distinctly pubescent, the broader lobules of the corolla are scarcely barbate and on the margin only, the gynostegium is much longer, etc. And if we admit with Corry,<sup>c</sup> Malme,<sup>d</sup> and others that the translatoria are in themselves sufficient to characterize species, we are forced to the absolute conclusion that there exists no near kinship between the Texan and the Guatemalan species. We reproduce here our camera lucida drawings of the translatoria of both *M. barbigerum* and *M. decipiens*.<sup>e</sup> In the first, the retinaculum is 0.2 mm. long, 0.07 mm. broad, the caudicles are thick, and the pollinia long pear-shaped.

*Metastelma sepicola* Pittier, sp. nov.

FIGURE 5.

A trailing, subvoluble vine, with slender, rounded, ramified stems. Internodes 2.5 to 3.8 cm. long.

Petioles slender, about 5 mm. long, sulcate, minutely hairy above. Leaf blades ovate, 15 to 30 mm. long, 5 to 15 mm. broad, acuminate, rounded at base, entirely glabrous except above on the main nerve, here pubescent, generally with two small glands at the insertion of the petiole, dark green above, grayish green below; margin entire, minutely and sparsely ciliate.

Cymes axillary, pedunculate; flowers small, up to 8 in each cyme. Peduncles slender, 5 to 15 mm. long, minutely hairy. Pedicels 1 to 2.5 mm. long. Calyx perceptibly verrucose outside, about 1 mm. long; lobes ciliate, rounded at tip, 0.7 mm. long, 0.55 mm. broad, with a scarious margin; calycinal glands finger-like, single. Corolla about 2.75 mm. long, campanuliform, white, the lobes about 1.6 mm. long, 0.75 to 1 mm. broad, lanceolate, emarginate at tip, glabrous outside, provided inside with two papillose thickenings confluent at tip and leaving a smooth center and margin. Corona scales inserted at the base of the anthers, equal to or scarcely longer than the gynostegium, arcuate, spatuliform, with the margin in-

<sup>a</sup> DC. Prodr. 8: 514. 1844.

<sup>b</sup> Linnaea 21: 760. 1848.

<sup>c</sup> Trans. Linn. Soc. Lond. Bot. II. 2: 173-207. 1881-1887.

<sup>d</sup> Öfv. Vet. Akad. Förh. 1900: 845. 1900.

lute at the base and the tip flat or rounded, the length 0.5 mm., the breadth 0.3 mm. Stamens 8.5 mm. long, with rather long filaments (1.1 mm.); apical membrane of the anther orbicular, slightly emarginate at tip, 0.3 mm. long, 0.45 mm. broad. Retinaculum about 0.14 mm. long, 0.06 mm. broad, naviculiform. Caudicles 0.12 mm. long, rather thick, articulate. Pollinia pendulous, elongate-pyriform, about 0.2 mm. long. Pistil smooth; styles about 1.4 mm. long.

Follicles not known.

COSTA RICA: Hedges around San José, altitude 1,150 meters, Tonduz, flowers, July, 1896 (Instituto fis.-geog. Costa Rica no. 10130; U. S. National Herbarium no. 471973, type); slopes above San Rafael de Cartago, Pittier, flowers, October 18, 1894 (Instituto fis.-geog. no. 9026).

These Costa Rican specimens were ascribed to *M. pedunculare* Decaisne by Mr. Donnell Smith. They agree with the short description given by the author<sup>a</sup> as to their leaves, but the inflorescences are always shorter than there given, and the flowers, which develop successively, are mostly more than 5 in each cyme. The type of *M. pedunculare* which is in the Herbarium of the Paris Museum, was collected by Hartweg (sub no. 601) at the Cuesta de Pinula, near Guatemala City.

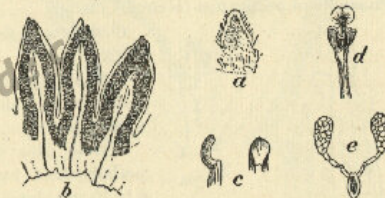


FIG. 5.—Flower parts of *Metastelma sepicola*. a, Lobe of calyx; b, part of corolla; c, scales of corona, lateral and front views; d, stamen; e, translatorium. a-d, Scale about 8; e, scale 32.

*Ditassa caucana* Pittier, sp. nov.

FIGURE 6.

A milky, subliguous vine. Stems and branchlets tomentose, voluble, diffuse. Leaves small, opposite, petiolate. Petioles hairy, 2 to 3 mm. long. Leaf blades lanceolate, 12 to 40 mm. long, 4 to 10 mm. broad, long-cuneate at base, mucronate at tip, dark green (in the dried state blackish), and sparsely hirsute above, densely tomentose and whitish underneath, with revolute margins.

Inflorescences cymose, axillary, and alternate, much shorter than the leaves. Pedicels densely hairy, 2 to 4 mm. long; bracteoles very small, ovate-lanceolate, hairy outside.

Calycinal lobes ovate-lanceolate, 1.4 mm. long, 0.6 mm. broad, inside with 5 cylindrical alternate glands. Corolla white, divided almost to the base into 5 ovate-lanceolate segments, these 2.3 mm. long, 1 mm. broad, sparsely hairy on both faces, striate longitudinally with dark lines and with a transparent, smooth right margin (covered in prefloration). Corona double; phylla of the outer row almost free, 1.8 to 2 mm. long, lanceolate, long-acuminate, with margins smooth or provided with one pair of symmetrical, more or less pronounced teeth; phylla of the inner row

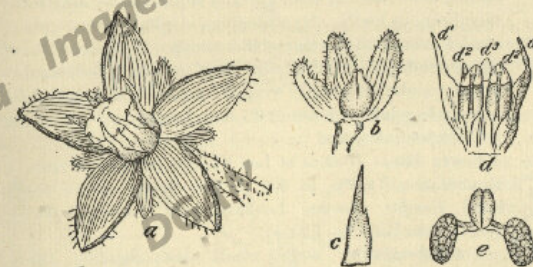


FIG. 6.—Flower parts of *Ditassa caucana*. a, Flower; b, ovaries and part of calyx; c, phyllum of the outer corona; d, front view of two stamens with the corresponding parts of the corona, showing comparative size; (d' d', phylla of outer corona; d'' d'', phylla of the inner corona; d''', anthers); e, translatorium. a-d, Scale 9; e, scale 32.

glands. Corolla white, divided almost to the base into 5 ovate-lanceolate segments, these 2.3 mm. long, 1 mm. broad, sparsely hairy on both faces, striate longitudinally with dark lines and with a transparent, smooth right margin (covered in prefloration). Corona double; phylla of the outer row almost free, 1.8 to 2 mm. long, lanceolate, long-acuminate, with margins smooth or provided with one pair of symmetrical, more or less pronounced teeth; phylla of the inner row

<sup>a</sup> DC. Prodr. 8: 514. 1844.



linear, 1.2 mm. long, adhering through their base to the gynostegium and slightly surpassing it. Pollinia small, ovoid (about 0.09 mm. long, 0.04 mm. broad), hanging from two short caudicles (about 0.024 mm. long); corpuscle broadly ovate (about 0.07 mm. long, 0.045 mm. broad). Gynostegium 1 mm. long. Stigmas obtuse. Follicles not known.

A species of the section *Orthotassa*.

COLOMBIA: El Saladito above Cali, on the road to Buenaventura, Western Cordillera of Colombia, altitude, 1,800 meters, Pittier, 754, flowers, December 21, 1905 (U. S. National Herbarium no. 53095, type).

*Cynanchum reflexum* (Hemsl.) Pittier.

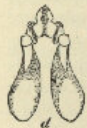
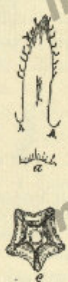


FIG. 7.—Flower parts of *Cynanchum reflexum*. a, Lobe of calyx; b, lobe of corolla; c, part of corona, outside view; d, translatorium; e, stigma; f, styles. a-c, Scale 5; d, scale 19.

Notwithstanding some small discrepancies, the identity of this species, as established by Mr. Donnell-Smith, with the one from Chontales (Nicaragua) described by Mr. Hemsley under the name of *Gonolobus reflexus*, is pretty certain. But our plant differs so much, in its habit and the structure of its flowers, from the remaining *Gonolobi* of Central America, that the propriety of placing it in this genus is doubtful. The small flowers with minute calyx and reflexed lobes of the corolla are unusual in the latter. By the elongated, cuplike corona, with inner appendages each division of which is marked by a bifurcated fibrovascular fascicle ending in two large teeth, by the small size of the translatorium and the peculiar shape of its retinacle, and last by its stellate stigma, our plant comes nearer to the section *Vincetoxicum* of the genus

*Gonolobus reflexus* Hemsl. Biol. Centr. Amer. 2: 333. 1382.

Stems subliguose, little ramified, erect or spreading but scarcely voluble, covered with long, whitish, articulate hairs.

Leaves also densely strigose-hairy, rather thick; petioles short (1 to 1.5 cm.); leaf blades ovate-lanceolate, 6 to 10 cm. long, 2.5 to 5 cm. broad, rounded at base with two petiolar glands, acuminate, paler beneath. Cymes 4-flowered, umbellate, axillary, almost sessile. Pedicels 2 to 3 cm. long, strigose-hairy. Calyx small (4 to 4.5 mm. from base to tips), strigose-hairy outside, smooth inside with 5 small glands alternating with the lobes, these narrowly lanceolate, 3 mm. long. Corolla rotate, greenish, finely brown-reticulate within, sparsely hairy outside, with a very short but distinct tube and a glabrous throat; lobes 7.5 long, 3 mm. broad, oblong with rounded tips, reflexed. Corona simple, cupuliform, 2.5 mm. high, appendiculate inside, with 10 larger tips ending fibrovascular fascicles and separated by smaller membranous teeth. Gynostegium stipitate, the stigma almost even with the tips of the corona. Anthers without appendages. Retinaculum 0.26 mm. long, 9.16 mm. broad; caudicles broadly winged; pollinia pear-shaped, more or less deflexed, about 9.7 mm. long.

Follicles unknown.

COSTA RICA: Bushes at Las Vueltas de Tucurrique, Reventazon Valley, at 600 to 700 meters above sea level, Tonduz, flowers, January, 1899 (Instituto fisiog. Costa Rica no. 13004).

Notwithstanding some small discrepancies, the identity of this species, as established by Mr. Donnell-Smith, with the one from Chontales (Nicaragua) described by Mr. Hemsley under the name of *Gonolobus reflexus*, is pretty certain. But our plant differs so much, in its habit and the structure of its flowers, from the remaining *Gonolobi* of Central America, that the propriety of placing it in this genus is doubtful. The small flowers with minute calyx and reflexed lobes of the corolla are unusual in the latter. By the elongated, cuplike corona, with inner appendages each division of which is marked by a bifurcated fibrovascular fascicle ending in two large teeth, by the small size of the translatorium and the peculiar shape of its retinacle, and last by its stellate stigma, our plant comes nearer to the section *Vincetoxicum* of the genus

*Cynanchum* and should be called *C. (Vincetoxicum) reflexum* (Hemsley) Pittier, or *Vincetoxicum reflexum* Pittier, according to the status conceded said section. In transferring the species, we have followed the view of Dalla Torre and Harms and adopted the former name.

*Roulinia rensoni* Pittier, sp. nov.

A voluble, slender, mostly glabrous vine.

Leaves rather sparse.

Petioles thin, 1.5 to 3 cm. long. Leaf blades 4 to 6 cm. long, 1.5 to 3 cm. broad, thin, ovate, acuminate, more or less deeply emarginate or cordate at base, pale underneath.

Inflorescences corymbose, pedunculate, the lower flowers deciduous. Peduncles rather thick, 2 to 3 cm. long, followed by an often longer rachis. Pedicels more or less pubescent, 2.5 mm. long. Calyx 3.5 mm. long, deeply incised, glabrous; lobules 2.9 to 3.1 mm. long, 0.9 to 1 mm. broad, elongate-elliptic, obtuse at tip, ciliate; calycinal glands, when present, single or geminate.

Corolla broadly campanulate, 5 to 5.4 mm. long, glabrous, deeply incised; lobules 4 mm. long, 1.5 to 1.8 mm. broad at base, contracted and bearing glandular-verrucose processes at about two-thirds of its total length and with rounded or slightly emarginate tips. Corona inserted at the base of the gynostegium, its lobes scarcely concrescent, their broader lower half with involute margins, the upper half trilobulate, the lateral lobules forming an acute point inflexed on the gynostegium; total length of the corona 2.2 mm.; length of lower part 1.2 mm., of the middle lobule about 1 mm. Stamens about 1.8 mm. long; anthers 1.3 mm. long, 1.2 mm. broad

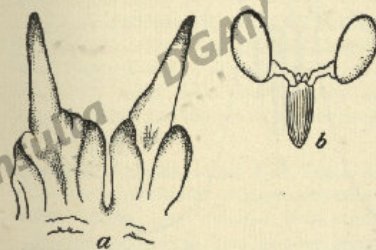


FIG. 9.—Flower parts of *Roulinia ugulata*. a, Part of corona; b, retinacle. a, Scale about 8; b, scale 32.

with a rounded apical membrane. Retinaculum 0.35 mm. long, 0.20 mm. broad, broadly fusiform, pointed at summit, often bicuspidate at base; caudicles about 0.23 mm. long, narrow at base, nearly 0.18 mm. broad at tip; pollinia ovoid,

FIGURES 8, 9.

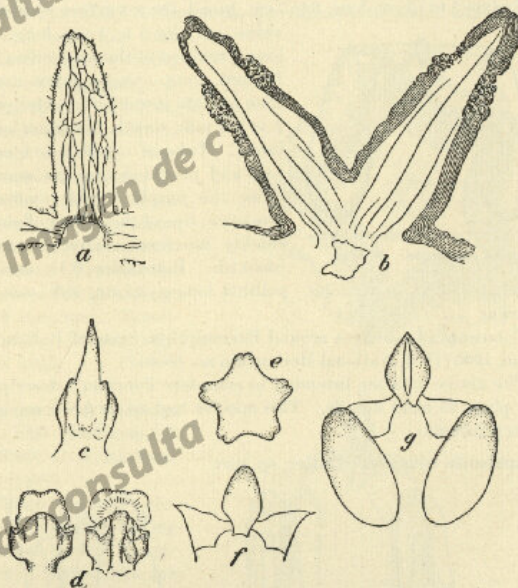


FIG. 8.—Flower parts of *Roulinia rensoni*. a, Segment of calyx; b, part of corolla; c, segment of corona; d, back and front views of stamen; e, stigma; f, retinacle (immature?); g, mature translatorium. a-c, Scale 9; f, g, scale 32.



0.6 mm. long, 0.25 mm. in diameter. Stigmatic head flat, starlike, about 1.4 mm. in diameter.

Follicles not known.

EL SALVADOR: Near San Salvador, without further indications, *Renson* 313.

**Marsdenia mollissima** Fourn. in Mart. Fl. Bras. 64: 322, pl. 95. 1885. FIGURE 10.

Leaves 5 to 10 cm. long, 3 to 7 cm. broad, the lower face whitish ferruginose with dark veins; petioles 3 to 4 cm. long. Peduncles 2 to 5 mm. long, provided at the base with a lanceolate bract, about 17 mm. long. Calyx lobes ovate-oblong, decreasing from outside inward, the exterior one 6 to 6.5 mm. long, 2 to 2.5 mm. broad, the inner one 4 mm. long, 2 mm. broad. Tube of corolla 5 to 6 mm. long, yellow at the base and provided near the same with 5 tufts of white hairs, the purple throat covered with a whitish pubescence; tips of the lobes yellow. Scales of the corona thickly mucronate, about 2 mm. long, opaque and blackish. Retinacles 0.17 mm. long, naviculiform; pollinia long-pyriform, 0.8 mm. long. Follicles not known.

FIG. 10.—Translatorium of *Marsdenia mollissima*. Scale 32.

COLOMBIA: In hedges around Barranquilla (State of Bolivar), *Pittier* 1563, flowers, June, 1906 (U. S. National Herbarium no. 600012).

The above data are intended to complete Fournier's description, which applies to our plant in most details. This species had never been reported heretofore west of Dutch Guiana.

**Marsdenia nicoyana** Pittier, sp. nov.

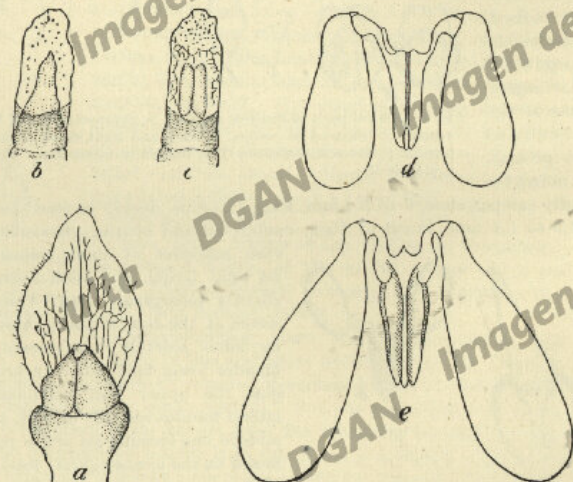


FIG. 11.—Flower parts of *Marsdenia nicoyana* and *M. propinqua*. Of former, a, part, showing calyx lobe and ovaries; b, anther, from the back, with segment of corona; c, anther, front view; d, translatorium. Of latter, e, translatorium. a-c, Scale 9; d, e, scale 32.

A laticiferous vine, climbing but not voluble, with short, floriferous branchlets. Stems woody, slender, with grayish bark.

Leaves opposite, rather small, petiolate. Petioles slender, 2.5 to 3 cm. long. Leaf blades elliptic-ovate, obtusely acuminate, 5 to 10 cm. long, 2 to 5 cm. broad, rounded

at the base, smooth, light green above, glaucous underneath; primary veins opposite or alternate, ascending, the broad interspaces finely reticulate; margin smooth, revolute; a tuft of gland-like organs on the main nerve on the upper face and near the base of the leaf blade.

Flowers greenish, in pedunculate axillary umbels; peduncles 6 to 10 mm. long, subfurfuraceous; pedicels brownish, furfuraceous, provided with small lanceolate, hairy bracteoles. Calyx 4 mm. long, with rounded lobes 2 mm. broad, hirsute outside, smooth inside, and ciliate on the margins. Corolla 1 to 7 mm. long; tube 2 to 3 mm. long, shorter than the calyx; lobes elliptic, rounded at tip, smooth and ciliate. Segments of the staminal crown lanceolate, by one-third shorter than the anther-bearing laminae. Lamina rounded, perfectly transparent at tip and dotted with starry, gland-like, minute, opaque spots. Translatoria rather small; pollinia about 0.3 mm. long; corpusculum about 0.18 mm. long. Ovary bilocular, 1 to 1.5 mm. long, smooth; stigmatic head pointed and bifid.

Follicles not known.

COSTA RICA: Along roads at Nicoya, Tonduz, flowers, April, 1900 (Instituto fit. geog. Costa Rica no. 13909; U. S. National Herbarium no. 577899, type).

This species differs from the other described Central American forms by having the scales of the staminal crown shorter than the staminal laminae; the pollinia are also reduced in size; the leaves are somewhat similar to those of *M. edulis* Watson, but are distinctly rounded, and not sub-decurrent, at the base, blunt and not acutely pointed at tip; their shape is more constant and the flowers in the umbel are more numerous.

Several specimens in the U. S. National Herbarium, collected in Central America, have been referred to *M. maculata* Hooker, but to my mind these identifications are very doubtful, and the whole section needs a thorough revision.

**Gonolobus edulis** Hemsl. Biol. Centr. Amer. 2: 331. 1882.

A vine, subvoluble or most generally creeping on low bushes, fallen trunks, or walls. Stems hairy, rounded, little ramified.

Petioles 2.5 to 4 cm. long, slender, hairy. Leaf blades 4 to 7 cm. long, 1.5 to 3.5 cm. broad, oblong-lanceolate, acuminate, shallow-cordate at base with broad sinus and rounded auricles, sparsely hairy, dark green above, paler with prominent brownish-hairy venation beneath. Two or more small glands at the insertion of the blade on the petiole.

Inflorescences cymose, axillary, unilateral, 3 to 5-flowered. Peduncles, pedicels, and bracteoles hairy; peduncles 1 to 2 cm. long; pedicels 1 to 3 cm. long; bracteoles small, linear. Calyx shortly campanulate, membranous, hairy outside, smooth

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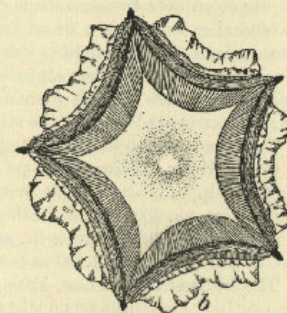


FIG. 12.—Flower parts of *Gonolobus edulis*. a, Translatorium; b, gynostegium, from above. a, Scale 32; b, scale about 8.

FIGURE 12.



inside, its divisions 10 mm. long from center, narrowly lanceolate, acuminate, alternating with small, tongue-shaped, pale glands. Corolla subcampanulate, pubescent outside, woolly inside, pale yellow, with spreading divisions, these 12 to 14 mm. long from insertion on tube, broadly lanceolate with more or less twisted tips. Outer corona 5-lobulate, inconspicuous; inner corona formed of 5 trapezoid brown scales, lying flat against the gynostegium and each bearing an inner radial lamella. Gynostegium stipitate; anthers broad, with horizontal cells, and covered with a thin membrane, extended exteriorly in a broad but short lobe. Retinaculum scutelliform 0.30 mm. broad; caudicles horizontal or subpendulous; pollinia claviform, 1.5 mm. long. Ovaries glabrous, subglobose; styles about 2.5 mm. long, connate for their upper half; stigma about 4.4 mm. in diameter, star-shaped, smooth, with a little knob in the center, corresponding with the stigmas.

Follicles large (10 to 12 cm. long, 5 cm. thick), fusiform, with 5 longitudinal wings.

COSTA RICA: Endres 213, type in Kew Herbarium; hedges around San Francisco de Guadalupe, altitude 1,270 meters, *Tonduz*, flowers, May, 1893 (Instituto fis. geog. Costa Rica no. 8003; U. S. National Herbarium no. 471846); same locality, *Tonduz*, flowers, July, 1894 (Instituto fis. geog. Costa Rica no. 8897; U. S. National Herbarium no. 334001); San José, 1,100 meters, *Donnell Smith* 6651, flowers, May, 1896.

The fruits of this species, known by the name of "cuayote" or "guayote" among the natives, are edible when still tender.

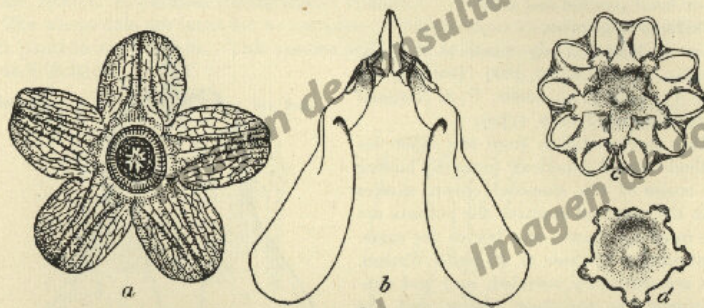


FIG. 13.—Flower and flower parts of *Gonolobus magnifolius*. a, Flower; b, translucarium; c, gynostegium, from above; d, stigma. a, Natural size; b, scale 21; c, d, scale about 6.

***Gonolobus magnifolius* Pittier, sp. nov.**

A vine with round, slender, lignose, hairy, little ramified stems.

Leaves very large. Petioles rather thick, 10 to 18 cm. long, hairy, sulcate. Leaf blades cordiform, acuminate, 21 to 24 cm. long, 18 to 22 cm. broad, deep green and pubescent above, brownish and thickly hairy, principally on the prominent veins underneath, beset with numerous setaceous glands at the insertion on the petiole.

Inflorescences cymose, axillary, unilateral, loose, with 6 or more large flowers opening in succession. Peduncles, pedicels, and bracteoles densely hairy; peduncles thick, 5 to 8 cm. long; pedicels 5 to 6 cm. long when fully developed, provided with basal bracteoles, linear-lanceolate, 8 to 10 mm. long. Calyx deeply incised; lobes ovate, 12 mm. long from center, 8 mm. broad, thickly hairy outside, pubescent inside, alternating with 5 rather large, brownish, transparent glands. Corolla large (38 to 40 mm. in diameter), flat, greenish yellow, finely reticulate, pubescent outside, glabrous inside; lobes ovate, 8 to 10 mm. long from the sinuses, 10 to 12 mm. broad. Outer corona obtuse, but forming a conspicuous ring about 9 mm. in diameter around the interior parts, at the throat of the corolla; inner corona thick, torulose, dark brown and bearing 5 lamellar, rounded tips standing erect against the stamens. Gynostegium equaling

or scarcely surpassing the inner corona. Stamens elongate, glabrous; anthers vertical, opening at the top and covered by a scutelliform blade reflexed on the stigma. Retinacles 0.5 mm. long, 0.17 mm. broad; pollinia pendulous, large (1.3 mm. long, 0.55 mm. in larger diameter). Ovaries very hairy. Stigma salver-like, with 5 trilobulate tips alternating with the anthers.

Follicles not known.

COSTA RICA: Forests of Las Vueltas de Tucurrique, Reventazon Valley; altitude 635 to 700 meters, *Tonduz*, flowers, March, 1899 (Instituto fis. geog. Costa Rica no. 13022; U. S. National Herbarium no. 472247, type); Valley of Tuis, Reventazon basin, altitude 600 meters, *Pittier*, flowers, September, 1901 (Instituto fis. geog. Costa Rica no. 16213); *Tonduz*, flowers, November, 1897 (Instituto fis. geog. Costa Rica no. 11554).

This plant, strikingly distinct from any other species of the genus and especially from the other Costa Rican species, was named *Gonolobus pittieri* in schedule by the late K. Schumann. We change this specific name to *magnifolius*, which reminds one of the good characters of the plant. It is a milky vine, growing in the shaded, hilly forests of the lower Atlantic slope and very seldom found with flowers or fruits. Mr. Donnell Smith identified the several specimens of this plant in his collection as *Gonolobus viridiflorus* Roem. & Schultes, a species from the low lands of Brazil and the Guianas that is cited <sup>a</sup> as having been collected near Cartago by Oersted. But a careful comparison of the said specimens with the original diagnosis <sup>b</sup> and the descriptions in the Botanical Register <sup>c</sup> and the Flora Brasiliensis <sup>d</sup> does not confirm this view.

***Gonolobus pseudobarbatus* Pittier, sp. nov.**

FIGURE 14.

Stems voluble, round, covered with a dense, short pubescence, intermingled with long, soft, brownish hairs.

Leaves soft, of medium size. Petioles slender, 2.5 to 3 cm. long, at once short-pubescent and pilose like the stems. Leaf blades 4 to 6 cm. long, 2 to 4.5 cm. broad, rounded-ovate to ovate-lanceolate, cordate with generally broad rounded sinus and auricles, acuminate; glandules at insertion of peduncles numerous and small; upper face dark green, sparsely hairy on the veins and punctate; lower face greenish white, with prominent, hairy, brown veins, and covered with minute, purple, gland-like hairs; margin ciliate; acumen conspicuously barbate.

Inflorescences umbellate, with 6 to 10 small flowers opening in succession. Peduncles and pedicels hairy-pubescent, the former thick, about 2 cm. long, the latter slender, about 3 cm. long when fully developed. Bracteoles small, lanceolate, barbate. Lobes of calyx lanceolate, acute, about 5 mm. long, 2 to 2.5 mm. broad, densely covered outside with long, soft hairs, smooth inside, alternating with small, claviform, translucent glands. Lobes of corolla ovate, obtuse, 7 mm. long, 4 mm. broad, greenish yellow with dark venules, covered outside with long soft hairs intermingled with dark, gland-like spots, smooth inside except along the right margin, which is partly covered with coarse white hairs. Corona prominent, fleshy, torulose, subpentagonal, of a purple color, with 5 spatulate appendages inserted at the inner angles and connected with the gynostegium. Gynostegium rather long-pedicellate. Anthers opening above and horizontally, with inconspicuous outer appendages. Retinacle 0.3 mm. long, 0.15 mm. broad, scutelliform; caudicles and pollinia pendulous, the latter about 0.75 mm. long. Ovaries free and smooth.

Follicles not known.

<sup>a</sup> Biol. Centr. Amer. 2: 335. 1882.

<sup>b</sup> Syst. Veg. 6: 61. 1820.

<sup>c</sup> 13: pl. 1126. 1827.

<sup>d</sup> 6: 36.

FIGURE 13.



COSTA RICA: Cerro de San Isidro near San Ramon, at an altitude of about 1,300 meters, *A. Brenes*, flowers, June 14, 1901 (Instituto fis. geog. Costa Rica no. 14504; U. S. National Herbarium no. 579710, type).

This specimen comes near *G. nigrescens* Schlecht. in the size and some details of the flower and reminds likewise of *G. barbatus* H. B. K., especially by the peculiar appendages along the inner right margin of the petals, but by some other important characters it is conspicuously distinct from the remaining Central-American species.

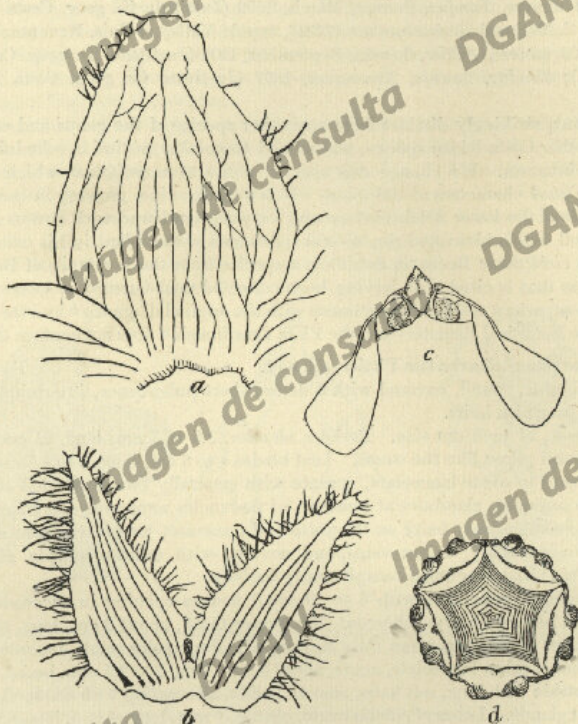


FIG. 14.—Flower parts of *Gonolobus pseudobarbatus*. a, Calyx lobes; b, corolla lobes; c, translatorium; d, gynostegium, from above. a, b, d, Scale 8; c, scale 30.

***Gonolobus dubius* Pittier, sp. nov.**

FIGURE 15.

Stems numerous, subglabrous, suberect or spreading, hairy. Internodes unequal, mostly long (up to 20 cm.), the plant thus appearing sparsely foliated.

Petioles slender, 2 to 4 cm. long, minutely pubescent. Leaf blades 4 to 7 cm. long, 2 to 5 cm. broad, ovate-acuminate, cordate at base, with the rounded auricles very open at earlier stages and close later; upper face dark green, subglabrous; lower face sparsely hairy, pale or brownish, with salient, minutely hirsute venation; two small glands at the insertion of the blade upon the petiole.

Inflorescences axillary, of few (1 to 4) flowers. Peduncles and pedicels minutely pubescent, the former 1 to 2 cm. long, the latter 3 to 4 cm. long and very slender. Calyx lobes lanceolate-acuminate, 10 to 11 mm. long, 2.5 mm. broad, minutely pubescent outside, smooth inside, sparsely ciliate on the margin, a minute, pointed, yellow gland at each intervening sinus. Corolla 3 to 4 cm. in diameter, stellate-pubescent

outside, smooth inside, greenish yellow, the lobes longitudinally striate with darker lines, narrowly triangular-acuminate, 15 to 16 mm. long, 5 to 6 mm. broad at the base. Exterior corona reduced to a narrow, membranous, ciliate ring inserted on the throat of the corolla; inner corona formed of 5 fleshy, brownish scales, connected together by alternating folds and imbricate. Gynostegium stipitate. Appendages of the anthers more or less spreading, dark-colored. Retinaculum about 0.22 mm. long; caudicles about 0.3 mm. long; pollinia pear-shaped, about 1.2 mm. long, 0.4 mm. broad. Stigma pentagonal, concave.

Follicles not known.

COSTA RICA: Over bushes at Jericó Farm, Llanos de Santa Clara, altitude 300 meters, Pittier, flowers, July, 1899 (Instituto fis. geog. Costa Rica no. 13416).

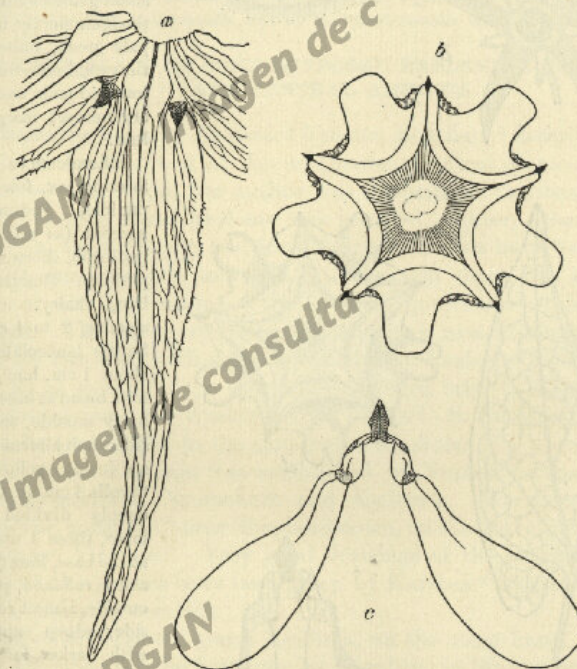


FIG. 15.—Flower parts of *Gonolobus dubius*. a, Part of calyx, showing glands; b, gynostegium from above; c, translatorium. a, b, Scale 8; c, scale 30.

Mr. Donnell Smith identifies this plant with *G. striatus* Mart. & Gal.<sup>a</sup> Although the very incomplete description of this latter species applies in a general way to our specimens, the identity of the two is very doubtful. *Gonolobus striatus* is a native of comparatively cold, dry, and mountainous country north of Mexico City and has not been found in the intervening region, whereas the Costa Rican plant proceeds from the humid and warm plains of Santa Clara. The presence of the same species at two stations at once so far apart and so distinct as to their climate would be quite exceptional. To remain on the safer side, we shall then consider our plant as a distinct species, until a direct comparison of types can be effected.

<sup>a</sup> See Bull. Acad. Sci. Belg. 11<sup>1</sup>: 365. 1844.



**Exolobus albomarginatus** Pittier, sp. nov.

A low trailing shrub, with erect axillary branchlets. Stems rounded, obscurely striate longitudinally and covered with stiff hairs. Branchlets finely pubescent, 15 to 20 cm. long.

Leaves opposite, long-petiolate. Petioles pubescent, slender, 4 to 6 cm. long. Leaf blades broadly ovate to lanceolate, acuminate, 4 to 9 cm. long, 2 to 5 cm. broad,

with a deep and wide open basal sinus and rounded auricles; upper face deep green, almost smooth or sparsely hairy, with 4 small glands at the base of the main nerve; lower face pale green, pubescent on the prominent, finely anastomosed main and secondary nerves; margin revolute.

Inflorescences axillary, forming lax, few-flowered panicles. Peduncles pubescent (as are also the pedicels), shorter than the petioles. Bractlets subulate, hairy. Pedicels slender, 2 to 4 cm. long. Sepals lanceolate, acute, about 1 cm. long, 2.5 to 3 mm. broad at base, densely hairy outside, smooth inside, each alternating with an inside yellow gland. Corolla 4 cm. in diameter, deeply divided into 5 lobes, these 4 mm. broad at the base, long (18 mm.), acute, reflexed, pubescent outside, almost smooth inside, deep apple-green with darker longitudinal lines and a narrow, pure white margin, the whole turning uniformly brown in desiccation. Outer crown membranous, green, forming 5 obtuse lobes, hairy outside and ciliate on the margin. Inner crown dark purple, slightly higher than the

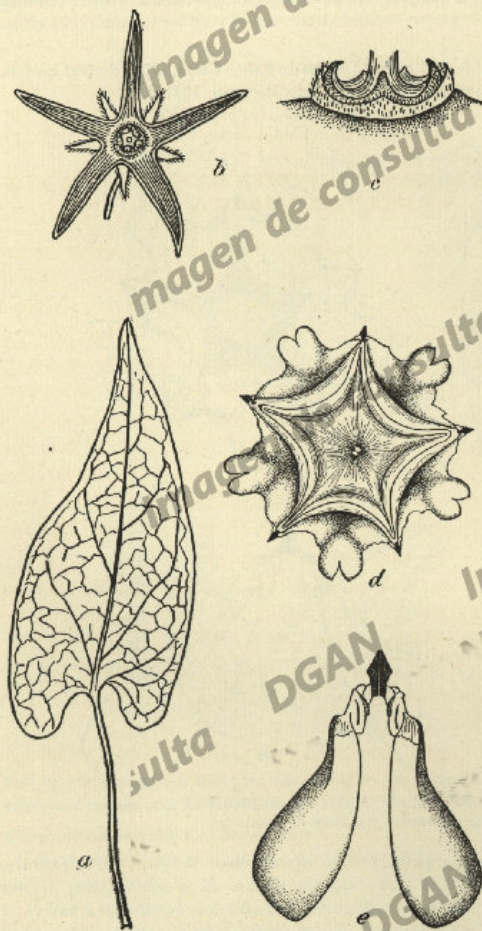


FIG. 16.—Parts of *Exolobus albomarginatus*. a, Leaf; b, flower; c, crown; d, gynostegium from above; e, translucarium. a, b, Natural size; c, scale about 5; d, scale 8; e, scale 31.

outer one, with an inwardly recurved, beak-like tooth opposed to each lobe of the former and united to the gynostegium by a thin, vertical membrane. Appendages of the anthers 2-lobate, rather broad, pendulous. Retinaculum about 0.28 mm. long;

FIGURE 16.

pollinia long pear-shaped, about 1.15 mm. long, subhorizontal. Stigma pentagonal, slightly concave.

Follicles not known.

COSTA RICA: Covering the trunks of fallen trees at Chirripó Farm, Zent Plains, on the eastern coast, Pittier, flowers, February, 1900 (Instituto fis.-geog. Costa Rica no. 16040; U. S. National Herbarium no. 573016, type).

This Costa Rican species of *Exolobus* is the first representative of this genus, which is mostly Brazilian, signalized in Central America. It is probable, however, that the monotypic genus *Trichostelma*, founded by Baillon<sup>a</sup> on a Mexican species, must also be referred to this genus, the only apparent difference being in the two lobules that mark the center of the stigmatic surface. Our species comes near *E. patens* (Decaisne) Fourn., from which it differs principally by the 4 glandules at the base of the leaf blade, by the form of the sepals, and by the characteristic white margin of the petals.

#### THE TRUE PLACE OF SOME SUPPOSED *ENSLENIAE* FROM MEXICO AND CENTRAL AMERICA.

Under the name of *Enslenia? ligulata*, Benth<sup>b</sup> described a plant collected by Hartweg at Aguascalientes, Central Mexico. As indicated by the ? sign, the author was doubtful as to whether the use of the generic name *Enslenia* was justified. Later, other specimens from the same country and from Central America have been assigned to the same species, and the interrogation mark has disappeared without any indication of the dubious question ever having been settled. The discovery by Dr. Renson of a new *Roulinia* led me to take up the case, with the conclusion that *Enslenia? ligulata* Benth., as well as several of the specimens collected later in Middle America and found under the *Enslenia* cover in the U. S. National Herbarium, must be transferred to the said genus *Roulinia*.

The genus *Enslenia* was established by Nuttall,<sup>c</sup> who gives as its nearest relatives *Cynanchum* and *Asclepias*. The type species is *E. albida*, collected "near Shepherdstown, on the gravelly banks of the Potomac, Virginia." Very good drawings of the characteristic features of this species have been given by Karsten,<sup>d</sup> together with those of his *Enslenia volubilis*.

The closely related genus *Roulinia*, on the other hand, was named and described for the first time by Decaisne, in his monograph of the *Asclepiadeae*.<sup>e</sup>

Improved descriptions of both genera are found in Benth<sup>b</sup> and Hooker's *Genera Plantarum*,<sup>f</sup> the comparison of which shows that the real distinction between the two is very small, but none the less so well marked that a confusion should not be possible. In *Enslenia*, namely, the corolla is bell-shaped, with the lobes more or less connivent; the scales of the corona are parted from the base—or, we should

<sup>a</sup> Hist. Pl. 10: 136. 1891.

<sup>b</sup> Pl. Hartw. 290. 1848.

<sup>c</sup> Gen. Pl. 1: 164. 1818.

<sup>d</sup> Fl. Columb. 2: pl. 162. 1862-69.

<sup>e</sup> In DC. Prodr. 8: 516. 1844.

<sup>f</sup> 2: 757 and 762.



say, very indistinctly connected at the base—and, if we adopt Nuttall's definition, "each terminated by two central filaments";<sup>a</sup> lastly, the stigma is obtusely conical and more or less distinctly bilobate. In *Roulinia*, the corolla is rotate, with reflexed lobes, and the scales of the crown are distinctly connate at the base, ending with a long, single appendage;<sup>b</sup> the stigma is depressed, with a scarcely conspicuous apex.

Now, the features that constitute the special characters of *Ensenia* are met with so far only in *Ensenia albida* Nutt. and *E. volubilis* Karst., some details of the floral structure of which are reproduced here after Karsten (fig. 17). As to *E. ligulata* Benth., the description agrees decidedly better with that of a *Roulinia*. It is true that the corolla is said to be campanulate, but this term can easily be applied to a rotate corolla in its first opening stage, just as the lobes of a campanulate corolla may be reflexed so as to give it a rotate appearance in a late stage of development. On the other hand, the scales

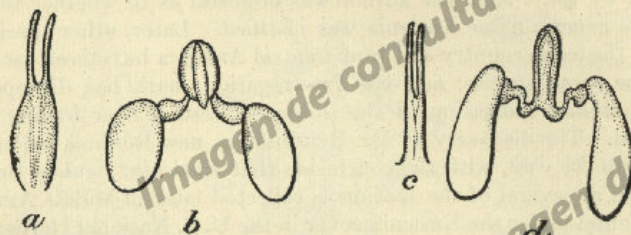


FIG. 17.—Flower parts of *Ensenia albida* and *E. volubilis*. Of former, a, segment of corolla; b, translatorium. Of latter, c, segment of corolla; d, translatorium. a, c, Scale 18; b, d, scale 44.

of the corona are described as "briefly connate at the base," and divided into 3 lobules, the lateral ones very short and obtuse, the middle one (single) protracted in a long, lanceolate tip; the stigma is pulvinate (but not conical nor bifid), umbilicate, and obscurely pentagonal.

Bentham's description applies quite well to specimen no. 14021 of Pringle, collected at Yautepec in the State of Morelos, Central Mexico, the only noticeable difference being that the elongate rachis of the raceme often bears more than 3 flowers (3 to 6) at a time, and that the dimensions of the several parts of these are much less. But as to these dimensions there is evidently a mistake, for a corolla 7

<sup>a</sup> The Genera reads (loc. cit.): "Corona squamæ 5, basi tubi staminei affixæ, erectæ, latae, membranaceæ, apice subtruncatæ et medio in ligulam integram 2-fidam v. duplicem productæ." The interpolation of the word "integram" is evidently intended to insure the place of *Ensenia ligulata* Bentham, but is also an unjustified swerving from one of Nuttall's best characteristics of his genus.

<sup>b</sup> The original description of DeCaisne (loc. cit.): "Foliosis ovato-rotundis crassiusculis in acumen erectum arcuatum v. inflexum v. bifidum desinentibus" is not supported, as to the italicized word, by his further diagnoses of 11 species.

lines, or nearly 1.5 cm. long, would be quite exceptional for either an *Ensenia* or a *Roulinia*. We find the calyx to be 2.5 to 3 mm. long, the corolla 5 to 5.5 mm., the corona segments from 3.5 to 4 mm. With these insignificant exceptions, and on the strength of Bentham's own description, I feel justified in transferring Hartweg's plant to the genus *Roulinia*, forming the combination *Roulinia ligulata* (Benth.) Pittier (fig. 9, p. 101).

The following details further supplement Bentham's description: Retinaculum 9.34 mm. long, 0.13 mm. broad; caudicles about 9.15 mm. long, rather thick; pollinia 0.35 mm. long, 0.18 mm. in diameter, ovate.

In her "Notes on the Genus *Rouliniella*," published 1902<sup>a</sup>, Miss Anna Murray Vail seems to have disposed satisfactorily of the Mexican and a few South American species of this genus. The same botanist also identifies no. 6349, Donnell Smith, with *Roulinia racemosa* Kuntze; but this determination is very doubtful, because our plant does not quite agree with Jacquin's somewhat vague description, nor with the illustrations given in the mentioned paper by Miss Vail. The first might apply as well to *Rouliniella columbiana* Vail, on account of the following very clear reference to the segments of the corona: "Nectaria quinque, erecta, longitudine calycis, ovata, plana, apice trilaciniato et acuminato," and of this other one referring to the lobules of the corolla: "laciniis lanceolatis, planis, patentissimis, . . . calyce paulo longioribus." Moreover, Jacquin's type was collected on the hill of La Popa near Cartagena, while Miss Vail's (Herbert H. Smith, no. 1668) proceeds from Honda, localities relatively close together and both situated in the lower, warm region of Colombia.

As to the use of *Rouliniella* advocated by Miss Vail in lieu of the old *Roulinia*, we simply note that it is not sanctioned by Dalla Torre and Harms.

#### THE SPECIES OF *OXYPETALUM* OF THE *CORDIFOLIUM* GROUP.

In his masterly monograph of the Brazilian *Oxypetala*,<sup>b</sup> Dr. G. O. Malme established a new systematic division of the genus, into two subgenera and seven sections, founded first on the structure and dimensions of the translators and then on the characters of the leaflets of the corona and their appendages. The following notes refer to a few species, new or not specially mentioned by Dr. Malme.

Three species of *Oxypetalum* have been so far described and cited as occurring in western Colombia, Central America, or the West Indies. They are *O. (Gallafreda) cordifolium* (Vent.), *O. riparium*

<sup>a</sup> Bull. Torr. Club 29: 462-463.

<sup>b</sup> In "Die Asclepiadaceæ des Regnellischen Herbars," Svensk. Vet. Akad. Handl. 34: 7. 1901. See also Öfv. Vet. Akad. Förh. 57: 843-865. 1900: Die systematische Gliederung der Gattung *Oxypetalum* R. Br., by the same author.



H. B. K., and *O. lindenianum* Turcz., the first two names being generally considered as synonyms. In addition to these, one species from Colombia is here described for the first time and probably two more have been confounded under one of the former names. All these species belong to the subgenus *Oxyptetalum* (Decaisne) Malme, characterized by broad, almost horizontal caudicles and by each caudicle being provided with a lateral, more or less excurved hornlet.

The first difficulty in classifying these species is as to their place in the five sections established by Malme. The fundamental characters made use of here are the dimensions and form of the retinaculum, the form and coherence of the crown leaflets, and the presence or absence of a horn-like appendage on the inner face of the latter.

So far as the first two groups of these characters are concerned, we are very well satisfied that the enumerated species all belong to the section *Odontostemma* Malme. We remain in doubt, however, when it comes to the last, which may be the fundamental distinction on which the section is based, viz, the presence on the inner face of each crown leaflet of a more or less free, horn-like appendage.

This appendage is clearly indicated in Ventenat's description of his *Gothofreda cordifolia*<sup>a</sup> and in figure 6 of the accompanying plate. No appendage is mentioned in Kunth's description of the corona of *Oxyptetalum riparium* H. B. K.,<sup>b</sup> whence most of the later authors have concluded to its absence. Turczaninow is silent as to this detail in describing his *O. lindenianum*. All the Costa Rican and Guatemalan specimens and my own from Colombia, are appendiculate, while the Cuban ones are not so.

With reference then to the presence or absence of the appendage on the leaflets of the corona, *O. cordifolium*, together with the plant collected by me in the Paez Valley and with the Central American species, would belong to section 3, *Odontostemma* Malme, while *O. riparium* and the Cuban specimens should be placed in section 4, *Rhipidostemma* Malme. The place of *O. lindenianum* remains doubtful.

Notwithstanding the opinion of several authors, beginning with Roemer and Schultes,<sup>c</sup> as to the identity of *Oxyptetalum riparium* and *O. cordifolium*, I believe that they are distinct species. First of all, as above stated, they belong to different sections by one of the essential characters upon which the subdivisions of the genus are founded.

<sup>a</sup> Ecaïlles . . . munies vers leur base interne de deux glandes entre lesquelles s'élève un corps cylindrique et courbé en dedans. Ventenat, Choix Pl. Cels 60 (au revers). 1803.

<sup>b</sup> Corona pentaphylla . . . foliolis cum laciniis corollae alternantibus, cuneatis, apice dilatatis, obliquis et emarginatis aut bilobis, crenulatis, carnosiss, margine tenuioribus, basi ad utrumque latus gibbosis; gibbis rotundatis.—H. B. K. Nov. Gen. & Sp. 3: 198. 1818.

<sup>c</sup> Syst. Veg. 6: 92. 1820.

Besides this, their habit is not exactly the same, the first plant being voluble and more or less spreading, whereas in *O. cordifolium* the stems are ligneous, almost straight and simply climbing, with erect branchlets. The leaves are decidedly heart-shaped in *O. cordifolium*, this detail being so marked as to have suggested the specific name, whereas they are lanceolate in *O. riparium*. The inflorescences of this latter species are prevailing axillary, whereas they are more slender and elongate, and often terminal in the first. The shape of the crown leaflets is not the same in both species, and lastly, they proceed from distant localities, *O. cordifolium* from Bogotá and *O. riparium* from Western Colombia, the altitudes being 2,600 and 2,000 meters, respectively.

If there is only one West Indian species, its identity with *O. riparium* is very doubtful. Six flowers of Wright's no. 406 from Cuba, showed uniform characters and the leaflets of the crown would be defined as "late cuneatis, apice flabellatis distincte trilobatis," whereas Kunth describes the same part of his species as "cuneatis apice dilatatis obliquis emarginatis aut bilobis, crenulatis . . ." a definition well exemplified in the drawings given in plate 231 of the cited work.<sup>a</sup> The Cuban plant also differs in a few other details, and moreover it is unlikely that a purely Andean species would appear again near the sea level in the Northern West Indies.

In conclusion as to these two points it seems reasonable to admit: First, that *Oxyptetalum cordifolium* (Vent.), not Schlechter and *O. riparium* H. B. K. are distinct species and, second, that *O. riparium* Kunth bears no relation to the Antillean species. I do not intend, however, to insist here on this last proposition.

Of *O. lindenianum* Turcz. we can only say that its description is too incomplete to admit of its being correctly placed among the other species. Its apparent connections are with *O. riparium* Kunth, and it differs by several good characters from the new *O. huilense* Pittier.

After much hesitation I have come to the conclusion that the form collected in Costa Rica under no. 10826 (Instituto fis.-geog. Costa Rica) corresponds to *Gothofreda cordifolia* Vent., which thus becomes *Oxyptetalum cordifolium* (Vent.) Schlechter, but exclusive of *O. riparium* Kunth and of the Antillean species. This species is carefully re-described hereafter, and the Guatemalan specimens distributed by Captain Donnell-Smith are referred to it.

Aside from the type station, as given by Kunth, *Oxyptetalum riparium* is indicated in two localities of the State of Vera Cruz in Mexico. Until the original specimens have been examined anew or new materials collected, it is not possible to decide whether this Mexican form belongs to the Cuban or to the Central American species.

<sup>a</sup> See note b, p. 112.



The three identified species at present known to occur in Colombia and Central America can be distinguished by means of the following key:

- Corona leaflets inappendiculate ..... *O. riparium*.  
 Corona leaflets appendiculate:  
   Membrane of the anthers rounded at tip ..... *O. cordifolium*.  
   Membrane of the anthers bilobate at tip ..... *O. huilense*.

*Oxypetalum cordifolium* (Vent.) Schlechter in Urban, Symb. Antill. 1:289. 1899 (excl. syn. *O. riparium* Kunth et sp. Antill.) FIGURES 18, 19, 20.

A climbing, ligneous vine with erect, axillary, pubescent branchlets.

Leaves opposite, rather variable in size, petiolate. Petioles slender, hairy, 2.5 to 6 cm. long. Leaf blades broadly cordate-acuminate, 5 to 12 cm. long, 3 to 9 cm. broad, palminerve; upper face sparsely hairy, lower face stiff-hairy and paler.

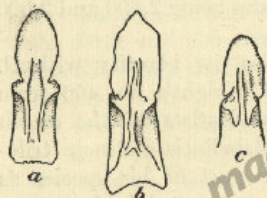


FIG. 18.—Stamens of *Oxypetalum cordifolium*. a, From no. 10862, Instituto fis.-geog. Costa Rica; b, from no. 12308, herb. etc.; c, from no. 4000, Donnell Smith Herbarium. a-c, Scale 9.

Inflorescence few-flowered, erect. Peduncles hairy, 5.7 cm. long; pedicels densely hairy, shorter than the petioles. Calyx divisions hairy, linear, 2 to 3 mm. long. Corolla claret-purple, hairy outside, smooth inside, the lobes linear, about 18 to 27 mm. long, 2 mm. broad at the base, narrowing into an acute apex. Leaflets of the corona 2.5 to 3.3 mm. long, exceeding the stamens, appendiculate, broadly flabellate, or cuneate and rather narrow in their lower part and then with the tips obtusely pointed,

subtrilobulate or distinctly trilobulate; appendage about 2 mm. long, shorter than the stamens. Stamens 2.8 mm. long, rather narrow, with an ovate-elliptic membrane 1 to 1.5 mm. long and rounded at the tip. Retinacles rather large, about 1.25 mm. long, the caudicles bearing a pair of laterally recurved hornlets; pollinia about 0.93 mm. long. Stigmatic head smooth, divided into two pointed branches about 3.5 mm. long. Follicles not known.

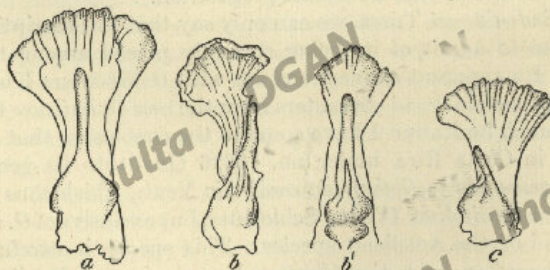


FIG. 19.—Leaflets of corona of *Oxypetalum cordifolium*. a-c, Scale 9.

COSTA RICA: San Pedro de la Calabaza, near Alajuela, altitude 1,100 meters; Tonduz, flowers, October, 1896 (Instituto fis.-geog. Costa Rica no. 10862; U. S. National Herbarium no. 577368); Atenas, on bushes along road, altitude 710 meters, Pittier, flowers, April, 1898 (Instituto fis.-geog. Costa Rica no. 12388; U. S. National Herbarium 577583).

GUATEMALA: Ojo de Agua, Departamento de Santa Rosa, altitude 1,170 meters, Heyde & Lux, flowers, September, 1892 (Donnell-Smith Herbarium no. 4000; U. S. National Herbarium no. 248281, distributed under the name of *O. riparium* Kunth).

All Central American specimens contained in the U. S. National Herbarium are here included under the name of *O. cordifolium* (Vent.) Schlechter, but there are certainly striking differences in their minor details, and were it not for a decided reluctance

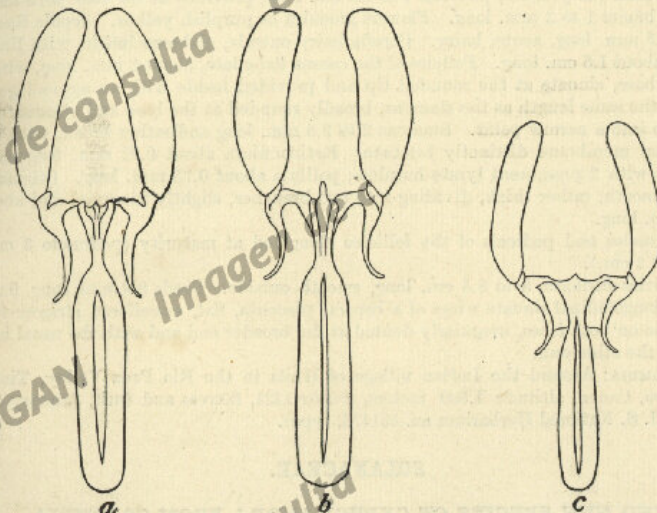


FIG. 20.—Translatoria of *Oxypetalum cordifolium*. a, From no. 10862, Instituto fis.-geog. Costa Rica; b, from no. 12388, herb. etc.; c, no. 4000, Donnell Smith Herbarium. a, b, c, Scale 32.

to founding new species on scanty material and the impossibility of comparing these at present with the types existing in other collections, one would feel inclined to separate them. Thus there

is no small divergence in the form of the leaves, these being typically heart-shaped and large in nos. 577368 (Costa Rica) and 207252 (Guatemala), and rather cordiform-lanceolate and small in nos. 243231 (Guatemala) and 577583 (Costa Rica). While the calyx and the corolla show little variation, the leaflets of the corona differ widely in form and size from one specimen to the other, as shown in fig. 19, the only constant feature being the inside finger-like appendage with bituberculate base. There is, furthermore, a general and seemingly constant difference in the dimensions of all floral organs, the San Pedro plant showing maxima, the Guatemalan one minima, while the Atenas plant comes between them.

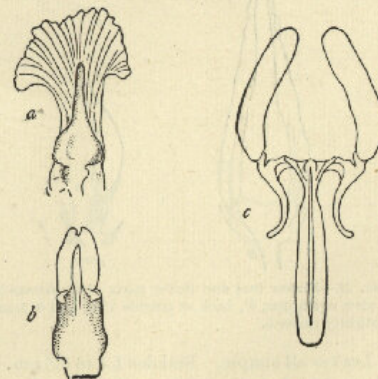


FIG. 21.—Flower parts of *Oxypetalum huilense*. a, Follicle of corona; b, stamen; c, translatorium. a, b, Scale 9; c, scale 32.

*Oxypetalum huilense* Pittier, sp. nov.

A voluble, milky vine, with subligneous, slender, sparsely ramified stems, smooth and finely striate on the older part, pubescent in the younger ones.

Leaves opposite, petiolate, rather small. Petioles slender, 1.5 to 2 cm. long, pubescent. Leaf blades 4 to 6 cm. long, 1.8 to 2.5 cm. broad, lanceolate or narrowly ovate-

FIGURE 21.



lanceolate, cordate, with a broad, rounded sinus, long-acuminate, sparsely hirsute on the upper face, stiff-tomentose and papillose underneath.

Inflorescences axillary, few (1 or 2?) -flowered. Peduncles pubescent, as long as or longer than the petioles; pedicels 1 to 1.5 cm. long, provided at the base with hairy linear bracts 1 to 2 mm. long. Flowers greenish or purplish yellow. Sepals linear, 2 to 2.5 mm. long, acute, hairy. Corolla hairy outside, glabrous inside, with linear lobes about 1.5 cm. long. Folioles of the corolla flabellate, about 3 mm. long, with a broad base, sinuate at the rounded tip and provided inside with an appendage of about the same length as the stamens, broadly rounded at the base and attenuate at the tip into a narrow point. Stamens 2 to 2.5 mm. long and rather broad, with the terminal membrane distinctly bilobate. Retinaculum about 0.92 mm. long; caudiculae with 2 prominent lyrate hornlets; pollinia about 0.75 mm. long. Stigmatic head smooth, rather thick, dividing into two branches, slightly incurved and about 3.5 mm. long.

Peduncles and pedicels of the follicles elongated at maturity (peduncle 3 cm., pedicel 2 cm.).

Follicles fusiform, 8 to 8.5 cm. long, smooth outside. Seeds 8.9 mm. long, fixed along longitudinal sinuate wings of a central placenta, flat, cuneiform, strigose-verruculose on both faces, irregularly dented at the broader end and with the usual hair tuft at the other end.

COLOMBIA: Around the Indian village of Huila in the Rio Paez Valley, Tierra Adentro, Cauca, altitude 1,800 meters, Pittier 1231, flowers and fruit, January 31, 1906 (U. S. National Herbarium no. 531476, type).

#### SOLANACEAE.

##### TWO NEW SPECIES OF CYPHOMANDRA FROM COLOMBIA.

*Cyphomandra dendroidea* Pittier, sp. nov.

FIGURE 22

Small tree, 3 to 4 meters high, with divaricate limbs, entirely glabrous except the younger leaves, which are slightly pubescent, and the woolly tips of the corolla.



FIG. 22.—Flower bud and flower parts of *Cyphomandra dendroidea*. a, Flower before anthesis; b, side view of stamen; b', back or outside view and b'' front or inside view of stamen; c, pistil. a-c, Scales slightly under 6.

Leaves all simple. Petioles 1.5 to 3.5 cm. long. Leaf blades 3 to 13 cm. long, 6 to 11 cm. broad, asymmetric, cordate or subcordate at base, broadly ovate-acuminate, dark green and almost glossy above, paler or brownish below.

Racemes axillary, dichotomous. Peduncles 6 to 8 cm. long; rachis 10 to 12 cm. long, with the scars of the pedicels scarcely salient. Pedicels 2 to 3 cm. long. Calyx 6 mm. deep, coriaceous, irregularly 5-lobed; the sinuses about 2 mm. deep, the lobes ending in an obtuse, ciliate apex. Corolla 22 to 23 mm. long, deeply cleft (tube about 2 mm. long), greenish; lobes 20 to 21 mm. long, 2.5 to 3 mm. broad at base, long-lanceolate, acuminate, woolly at tips. Stamens erect; filaments 1.8 to 2.2 mm. long; anthers





CYPHOMANDRA NARANJILLA PITTIER.

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about 7 mm. long; connectives brown, very thick, with the pale yellow cells attached laterally on the ventral or inside face. Pistil about 11.5 mm. long; ovary ovoid, 2.5 mm. long; style filiform, 8 to 10 mm. long, slightly clavate. Fruits spherical, 4 cm. in diameter, yellow, hanging 2 or 3 together at end of rachis.

COLOMBIA: Margin of the forest at Córdoba, Dagua Valley, at about 60 meters above sea level, in the rain belt of the Pacific Coast, flowers and fruits, December 7, 1905, Pittier 512.

At first this species was referred to the little known Peruvian *C. obliqua* Sendtn., on account of the decided similarity of our specimens to figure a, plate CLXV, volume 2, of Ruiz & Pavon's Flora Peruviana. The plant from Córdoba, however, is not suffrutescent but decidedly ligneous and growing to the size of a small tree; the inflorescence is dichotomous, the corolla greenish with woolly tips, the stamens much longer and more slender than in *C. obliqua*, and the berries quite round. *C. arborea* seems to belong in § 2, \* \* \* of Sendtner's systematic arrangement,<sup>a</sup> but is quite distinct from any of the species included therein.

*Cyphomandra naranjilla* Pittier, sp. nov.

PLATE 17. FIGURE 23.

A small tree, 2 to 3 meters high. Trunk straight, erect. Branchlets dichotomous, almost horizontal or pendulous.

Leaves dimorphic, the cauline or basal ones 5-lobate, the terminal ones, on the branchlets, simple. Basal leaves: petioles thick, 10 to 12 cm. long; blades cordate at base, 24 cm. long, 23 cm. broad, the broad interlobular sinuses reaching two-thirds of the half breadth; lobes lanceolate, acuminate; upper face glabrous, dark green; lower face paler, finely granulate. Terminal leaves: petioles slender, 2 to 4 cm. long, finely granular-pubescent; blades coriaceous, 12 cm. long, 5 cm. broad, ovate-lanceolate, cordate or subcordate, long-acuminate.

Cymes scorpioid, simple, elongate (15 to 25 cm. long), glabrous. Flowers very numerous, caducous, the scars of the pedicels being very prominent on the rachis. Pedicels 1.5 to 2.5 cm. long, slender, glabrous. Calyx urceolate or cupuliform, about 2.5 mm. deep, obscurely crenate, coriaceous. Corolla about 25 mm. in total length, sparsely hairy inside, purplish green; tube about 2 mm. long; lobes 23 mm. long, 2.5 to 3 mm. broad at base, long-lanceolate, acuminate, ciliate. Stamens erect; filaments 3 mm. long; anthers 7 to 8 mm. long, purplish yellow; terminal pores marked by a few diminute erect hairs. Pistil smooth; ovary rounded-conical, 3.5 mm. high; style filiform, elongate, 8 to 10 mm. long; stigma shortly clavate. Fruit egg-shaped, pendulous, yellowish green, the long diameter 5 cm., the short diameter 4 cm.

COLOMBIA: Growing wild in the mountains above Palmira and cultivated in the garden at La Manuelita, near the same town, Cauca Valley, altitude 1,200 to 1,800 meters. Our specimens are from the garden, Pittier 914, January 2, 1906 (U. S. National Herbarium no. 531106, type). The fruits, called *naranjillas*, are edible, very juicy, and with an agreeable, sweet, acidulate flavor.

This new species belongs to the group of heterophyllous *Cyphomandrea*, of which *C. pendula* Sendtn. and *C. heterophylla* Taub. are the South American types, while the group is represented in Central America by *C. costaricensis* Donnell Smith.

Sendtner<sup>b</sup> has partially described a considerable number of Colombian forms of this genus, but none of his descriptions seem to apply to our two new species.

EXPLANATION OF PLATE 17.—Leaves, flowers, and fruit. From a photograph taken by Mr. C. B. Doyle in the garden at La Manuelita.



FIG. 23.—Stamen and pistil of *Cyphomandra naranjilla*. Scale about 3.

<sup>a</sup> In Walp. Repert. Bot. 6: 576-579. 1846-47.

<sup>b</sup> Loc. cit. 579.



## CUCURBITACEAE.

## A NEW SPECIES OF CAYAPONIA AND TWO OF ANGURIA.

*Cayaponia macrantha* Pittier, sp. nov.

Stems slender, sulcate, glabrous, slightly pubescent at the nodes, densely foliose; branchlets short and numerous.

Petioles sulcato-striate, 1.5 to 2 cm. long. Leaf blades ovate, 7 to 12 cm. long, 5 to 10 cm. broad, deeply trilobate, attenuate and slightly emarginate at base, dark and scabrous above, pale and minutely white-dotted beneath with a few elliptic glands near the petiole; margin remotely dentate; lateral main ribs not marginal at base; lobes ovate-lanceolate, the median one longer, the lateral ones oblique and often bilobate. Tendrils simple or bifid.

Male flowers long-pedunculate, solitary in the axils. Peduncles erect, striate, 4 to 6 cm. long. Calyx campanulate, 1.8 cm. long and about 1.5 cm. broad, brownish, sparsely covered with multicellular hairs emerging from a bulb-like base; teeth remote, reflexed, acutely triangular, 3 to 5 mm. long. Corolla yellowish white, large (4 cm. long, nearly 5 cm. in diameter when open) tube woolly-pubescent inside; lobes ovate-rounded, 2 cm. long, about 1.5 cm. broad, covered on both faces with a dense velvety indument consisting of multicellular hairs. Filaments of stamens 5 mm. long, woolly; anthers coherent, forming an ovate-cylindrical head 13 to 14 mm. long and 4 mm. in diameter. Pistillodium thick, trilobate. Female flowers wanting.

Fruit large (about 5 cm. in diameter), round, yellow with green stripes. Seeds like a middle-sized bean, 13 mm. long, 7.5 mm. broad, compressed.

COSTA RICA: Climbing on bushes at Las Vueltas de Tucurrique, Reventazon Valley, at an altitude of about 635 meters, *Tonduz*, flowers and fruits, December, 1898 (Instituto fis. geog. Costa Rica no. 12840; U. S. National Herbarium no. 577647, type).

*Anguria magdalenae* Pittier, sp. nov.

Plant entirely glabrous, except the papillose petals. Stems slender, rounded, longitudinally striate, smooth.

Leaves green and minutely punctate above, paler beneath, deeply emarginate at the base and deeply 3-lobate. Petioles rather strong, striate, 4 to 5 cm. long. Leaf

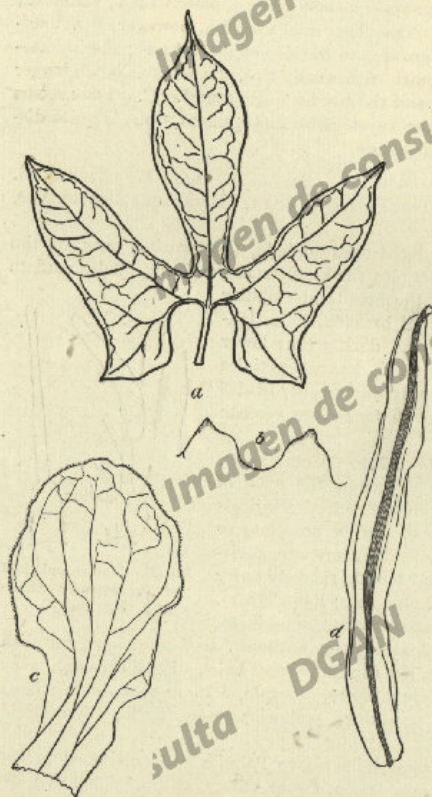


FIG. 24.—Leaf and flower parts of *Anguria magdalenae*. a, Leaf; b, part of calyx showing two teeth; c, lobe of corolla; d, stamen. a, Scale 1; b-d, scale 5.

FIGURE 24.

blades 14 to 18 cm. long, 14 to 16 cm. broad; basal sinus about 4 cm. deep and 5 cm. broad; lateral lobes broadly auriculate and more or less triangular-acuminate; middle lobe ovate-lanceolate, acuminate, narrower at the base; venation conspicuous on both sides, the lateral main nerves bifurcate and at first contiguous to the margin of the sinus. Tendrils rather slender.

Flowers middle-sized. Peduncles of the male inflorescence stout, more or less sulcate in dry specimens, smooth, 20 to 24 cm. long, and bearing a short spike of 5 to 15 sessile flowers. Tube of the calyx subcylindrical, slightly ventricose at the base, 10 to 12 mm. long, 3 mm. broad; teeth triangular, slightly contracted near the tip, 1 mm. long. Petals obovate, obtuse at the apex, sparsely papillose, red, 6 to 7 mm. long. Anthers linear, scarcely shorter than the tube of the calyx and about 1 mm. thick; appendage barely 0.3 mm. long, obtuse and not papillose.

Female flowers and fruits not known.

COLOMBIA: Around Rio Frio, between the Ciénega de Santa Marta and the foothills (State of Magdalena), altitude about 100 meters, *Pittier* 1630, male flowers, July 4, 1906 (U. S. National Herbarium no. 600066).

On account of its straight anthers with glabrous appendage, and its subsessile male inflorescence, this species should take place near *A. warszewiczii* Hook. and *A. pallida* Cogn., only that it differs from both by its simple 3-lobate leaves. By the coincidence of two of the above characters, viz., the glabrous appendage and 3-lobate leaves, our plant constitutes a new feature in the genus *Anguria* and along with the sessile flowers and the general glabrescence, these characters give sufficient ground for describing it as a new species.

*Anguria limonensis* Pittier, sp. nov.

Stems slender, sulcate or angulose-striate, glabrous.

Leaves 3-foliate. Petioles 3 to 4 cm. long, rather thick, subcanaliculate, pubescent; petioles 5 to 10 mm. long. Leaflets ovate to lanceolate, more or less attenuate at the base, acuminate at the tips, glabrous, dark green above, paler beneath; nervation pinnate, scarcely prominent below; margin entire or obscurely sinuate; middle leaflet 8 to 15 cm. long, about 4 cm. broad, the lateral ones smaller, often asymmetrical and sublobate. Tendrils strong, terete, smooth.

Male flowers small, sessile or subsessile. Common peduncle 10 to 25 cm. long, deeply sulcate, bearing a short spike of 20 to 25 flowers. Calyx 8 to 10 mm. long, green, cylindrical and scarcely ventricose at the base, striate; teeth spreading, more or less subulate, 0.5 to 1 mm. long. Petals red, ovate, very briefly unguiculate, obtuse at the tip, hairy-papillose on both faces, 4 to 6 mm. long, 2 to 3 mm. broad. Stamens inserted on the tube of the calyx at the upper end of their lower half, linear, 7 to 9 mm. long, 1 mm. thick, with a very short (0.3 mm.), rounded, papillose appendage. Female flowers and fruits unknown.

COSTA RICA: Along the Caribbean coast between Port Limon and Moin, *Pittier*, male flowers only, September, 1899 (Instituto fis. geogr. Costa Rica no. 16112).

This species is nearly related to *Anguria triphylla* Miquel, from which it differs mainly by the dimensions and a few other characters of the male flowers.

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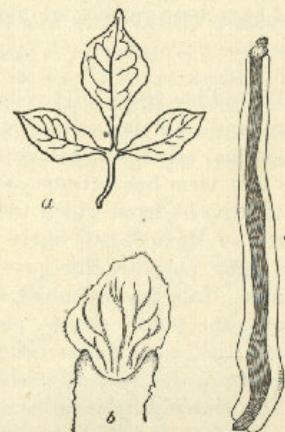


FIG. 25.—Leaf and flower parts of *Anguria limonensis*. a, Leaf; b, part of perianth showing two teeth of calyx and one segment of corolla; c, stamen. a, Scale 1; b, c, scale 5.

FIGURE 25.



## THE COSTA RICAN SPECIES OF CYCLANTHERA AND SOME RELATED PLANTS.

The species of the genus *Cyclanthera*, and to a less extent those of the other genera considered here, are of interest to the economic botanist because the fruits, and sometimes the tender shoots, of several of them have been from the remotest time among the natives of Middle America and of Western South America favorite vegetables, and have been readily adopted by the Spanish-American race.

## CYCLANTHERA.

The edible fruits of *Cyclanthera* are called *cahuas* or *caigues* in Peru and Bolivia, *achocchas* in Ecuador, and *achuchas* in Western Colombia, all of which names are of Kitsua origin. In Costa Rica, the first term has become *caifa*, and in Guatemala *caiba*; and, as one of the species from which the edible fruits are derived extends as far north as Mexico, it is likely that they are used all over the area for the same purpose and have correspondingly received some native names. In a few instances, not only the fruits but also, as indicated above, the tender shoots, play a part in the native culinary art, in Costa Rica, such shoots being known as *quelites*, a general term derived from the Nahuatl *quelill*, meaning "sprout" or "shoot."

The sources of the caifas or achuchas, as far as known, are *Cyclanthera pedata* and *C. tenuisepala* (fig. 26) in South America, *C. pedata* (pl. 13) and perhaps also *C. tonduzii* in Costa Rica, and in Guatemala *C. multifoliata*, the fruits and shoots of which Mr. O. F. Cook found in use at Purulhá. These four species are true *Cyclantherae*, characterized by the peculiar discoid structure of the single anther. *Cyclanthera pedata*, the generic type, is a very variable plant, and it is questionable whether *C. tenuisepala* is not the same species or at the most a subspecies, growing under special conditions, namely, in a wet climate or in shady places with rich soil, as can be inferred from the leafiness, size, and delicacy of the specimens at hand. According to the author's description, the main distinctive characteristics are in the thread-like calyx-teeth of the male flower, longer than the corolla, and in the very small fruit. But it is found that the length of those teeth is variable in the three nearest related species of the group, and besides, it is very doubtful whether Mr. Cogniaux had a fully grown fruit at his disposal on which to found his description. The plant from which specimens were collected by Miguel Bang at Cochabamba (*Plantæ bolivianæ* no. 1260), the flower of which is here reproduced (fig. 26), is said to have been under cultivation, evidently for its fruits. Of these there is only one immature and smooth specimen, and that is over 2 cm. long and 9 mm. broad, that is to say, larger than the mature fruit should be according to the dimensions given in the original description. But again, the leaves of our specimens have mostly long petioles and large leaflets that

agree better with what is considered to be *C. pedata*. On the other hand, specimens of *C. pedata* in the National Herbarium, with short calycinal appendages and large fruits, are not otherwise distinguishable from the former. In both forms the fruit is either smooth or aculeate. *Cyclanthera pedata* grows in Costa Rica and Central America generally, but several of the National Herbarium specimens collected in that region and labeled as this species belong more likely to the nearly related *C. tonduzii*, which differs by its female flowers borne on rather long, stiff pedicels and with densely aculeate ovary, and also by the rounded fruits, rather dry, and always covered with rigid spines. The statement made in the "Plantas usuales de Costa Rica" by the present writer, that the *caifas* proceed from this plant, may be erroneous, as is the name under plate 13, which should read "*Elateriopsis oerstedii*." Specimen no. 9787 of the Instituto físico-geográfico (U.S. National Herbarium no. 471840), the only one originally labeled as *caifa*, was wrongly identified as *C. tonduzii*; it is certainly *C. pedata* and it came from San Rafael de Cartago, where it grows abundantly, covering at times the stone walls and bushy hedges that surround the truck gardens. That the identity of our *caifa* is as stated is confirmed by the fact that in the same neighborhood Oersted collected his nos. 58 and 60 (Copenhagen Herbarium) which, according to Mr. Cogniaux, belong to the same species. Nevertheless, it is not yet quite clear whether the tender young fruits of *C. tonduzii* are not likewise used as a vegetable. As only a short and incomplete diagnosis of this plant has been published, its full description is given below.

In addition to the above-mentioned species, four more have been so far reported from Costa Rica, of which it is not known whether the fruits or the tender shoots are used as articles of diet. We give below the distribution, general and special, of the six species, which can readily be distinguished by means of the following key:

## KEY TO THE SPECIES.

Leaves pedate or digitate.

Primary leaflets 5.

Fruits oblique, smooth or with soft spines only at base..... *C. pedata*.

Fruits almost straight, always echinate..... *C. tonduzii*.

Primary leaflets 3.

Leaflets crenate or slightly lobate. Fruits with short peduncles.....

*C. naudiniana*.

Leaflets dentate, the lateral ones often 3-lobate. Fruits with long peduncles.....

*C. langaei*.

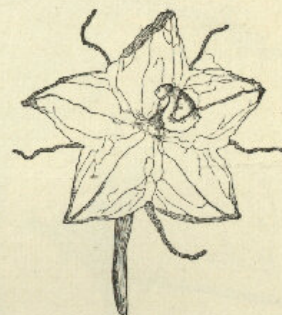


FIG. 26.—Male flower of *Cyclanthera tenuisepala*. Scale 6.



Leaves trilobate.

Lobes deeply cleft, ovate-lanceolate..... *C. costaricensis*.

Lobes less deep, triangulate..... *C. explodens*.

1. *Cyclanthera pedata* Schrad. Linnaea 8: litt. 23. 1833. PLATE 18.

General distribution: along the South American Andes, from Bolivia to Panama, and in the mountainous region of Middle America, reaching to Central Mexico. Often cultivated for its edible fruits and shoots.

COSTA RICA: Near Cartago (Oersted nos. 59 and 60, in Copenhagen Herbarium); San Rafael de Cartago, altitude 1,450 meters, Pittier, flowers, November, 1895 (Instituto fis.-geog. Costa Rica no. 9787).

EXPLANATION OF PLATE 18.—Flowers, fruit, etc. From photographs taken at Cali, Cauca, Colombia, by C. B. Doyle and H. Pittier.

2. *Cyclanthera tonduzii* Cogn. Bull. Soc. Bot. Belg. 30: 274. 1892.

FIGURES 27, 28, 34.

Ramis ad nodos brevissime puberulis cacteris glaberrimis, foliis longe petiolatis, palmato-5-foliolatis; foliolis supra tenuissime punctato-scabriusculis, subtus glaber-

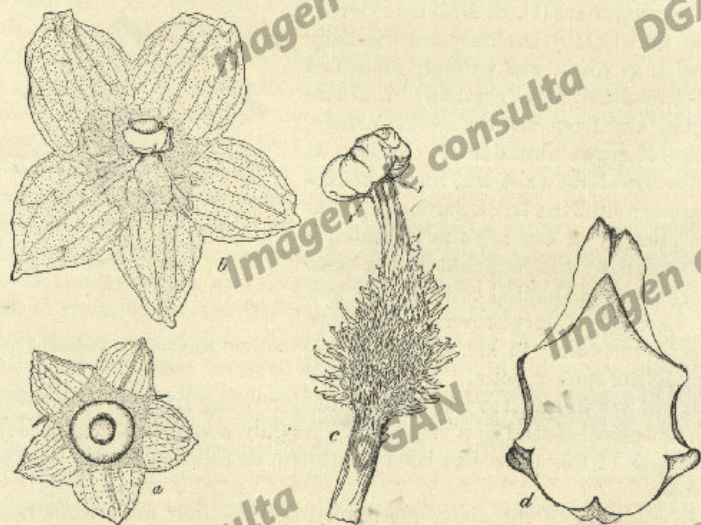


FIG. 27.—Parts of *Cyclanthera tonduzii*. a, Male flower, just open; b, full-grown flower; c, pistil (a, insertion of calyx and corolla); d, seed. a-d, Scale 6.

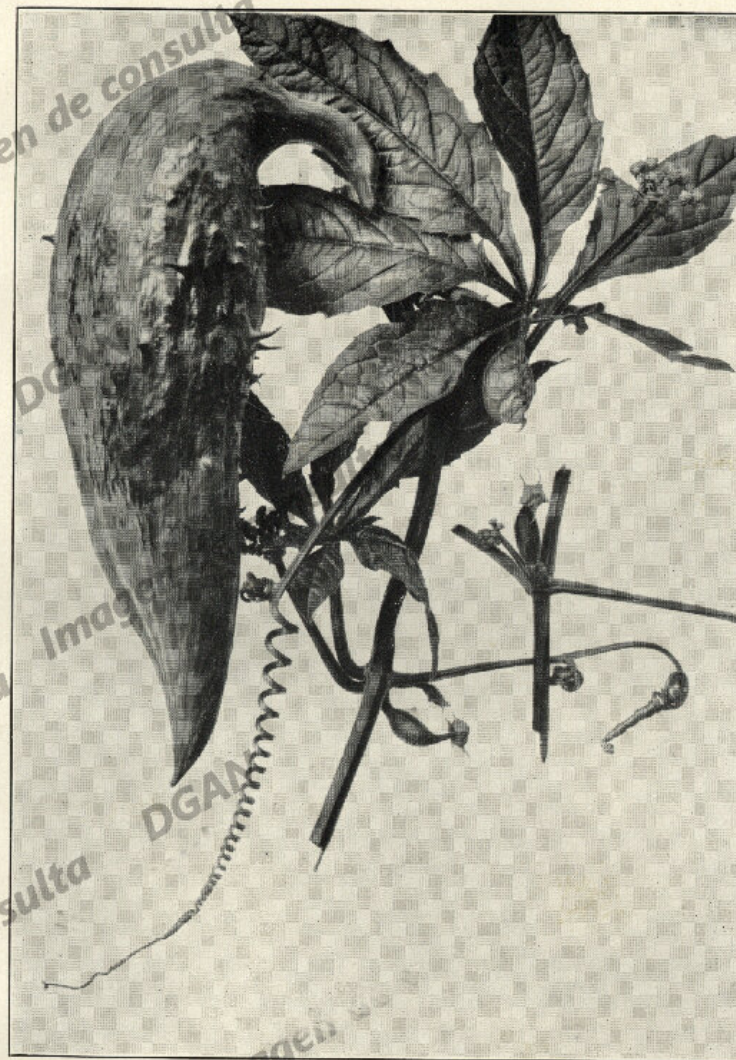
rimis laevibusque, saepius profunde lobatis vel trisectis, segmentis obtusis terminali acuto; cirrhis bifidis; pedunculis communis masculis vix ramosis, foliis plerumque longioribus, floribus parvis, superne in fasciculos paucifloris subverticillatim ramulosos; calycis dentibus setaceis plus minusve longis; fructu breviter pedunculato, dense echinato, apice longe acuminato.—Cogniaux, loc. cit., emend.

Stems slender, angulose, little branched, smooth.

Leaves variable in size, texture, and subdivision of the lobes. Petioles 3 to 10 cm. long, slender, striate. Leaf blades 4 to 12 cm. long, 5 to 14 cm. broad, more or less punctate, light green above, paler beneath. Leaflets shortly petiolate, denticulate or subrenate, the tips and teeth mucronate, the three middle leaflets more or less pinnate, the exterior ones almost always distinctly trilobate-auriculate. Tendrils bifid, rather slender and elongate.

Contr. Nat. Herb., Vol. 13.

PLATE 18.



CYCLANTHERA PEDATA SCHRAD.



Peduncles of the male inflorescence nude, angulose-striate, mostly longer than the leaves, the 20 to 30 flowers more or less congested in a few terminal fascicles. Pedicels capillary, 2 to 5 mm. long. Calyx glabrous, broadly spreading, about 3 mm. in diameter; teeth subulate-setaceous, 0.6 mm. long. Corolla white; segments ovate, more or less rounded at tip, about 2 mm. long, 1.5 to 2 mm. broad, more or less regularly 7-veined, pubescent, glandular or papillose. Staminal disk with a crown of papillose hairs around the connective. Pedicel of the female flower 1.5 to 2 mm. long. Calyx and corolla as in male flower. Ovary fusiform, rounded at base, echinate throughout except on the long terminal rostrum. Stigma sessile, rounded-depressed, sublobulate, 2 to 2.5 mm. broad, 1 mm. high.

Fruiting peduncle 2 to 3 cm. long. Fruit 2 to 2.5 cm. long, 1 to 1.5 cm. in diameter, densely covered with hard, hooked spines, many-seeded. Seeds elongate (5 to 6 mm. long, 3 to 4 mm. broad, 0.5 to 1 mm. thick), flattened, appendiculate at base, regularly sinuate on the margin, brown or yellowish brown, smooth.

COSTA RICA: Hedges around San José, altitude 1,200 meters, *Tonduz*, flowers, November 28, 1889 (Instituto fis.-geog. Costa Rica no. 1449; San Francisco de Guadalupe, altitude 1,200 meters, *Tonduz*, flowers and fruit, November, 1893 (Instituto fis.-geog. Costa Rica no. 1551, in part); along Rio María Aguilar near San José, altitude 1,100 meters, *Tonduz*, flowers and fruit, December 29, 1892 (Instituto fis.-geog. Costa Rica no. 2768); Alto de Ochomogo, altitude 1,500 meters, *Tonduz*, flowers and fruit, October, 1896 (Instituto fis.-geog. Costa Rica no. 10904); bushes around Nicoya, altitude 300 meters, *Tonduz*, fruit, January, 1900 (Instituto fis.-geog. Costa Rica no. 13509).



FIG. 28.—Leaves of *Cyclanthera tonduzii*. a, b, Extreme forms and sizes. Scale  $\frac{1}{2}$ .

GUATEMALA: Carrizal, Department of Santa Rosa, altitude 2,700 meters, *Heyde & Luz*, flowers, November, 1892 (Donnell Smith Herbarium no. 4187).

3. *Cyclanthera naudiniana* Cogn. in DC. Monogr. Phan. 3: 831. 1881.

FIGURE 29.

General distribution: From Texas and New Mexico south to Panama.

COSTA RICA: Found by Warszewicz, about 1848 (Herb. Boissier), but not reported since.



FIG. 29.—Leaf of *Cyclanthera naudiniana*. Scale  $\frac{1}{2}$ .

4. *Cyclanthera langaei* Cogn. Diagn. Cucurb. 2: 67. 1877. FIGURES 30, 34.

General distribution: Middle America, from Central Mexico to Panama.

COSTA RICA: El Titoral, near Rio Birris, slopes of Volcan Irazú, altitude 2,400 meters, *Pittier*, flowers, January 28, 1889 (Instituto fis.-geog. Costa Rica no. 881); Carrillo, Rio Sucio Valley, altitude 3,002 meters, *Cooper*, flowers, July, 1888 (Instituto fis.-geog. Costa Rica no. 888); San Francisco de Guadalupe near San José, 1,200



meters, *Tonduz*, flowers, December, 1895 (Instituto fis.-geog. Costa Rica no. 1551, mixed with *C. tonduzii*); around Sipurio, Talamanca, altitude 100 meters, *Tonduz*, flowers, March, 1894 (Instituto fis.-geog. Costa Rica no. 8704); Jimenez, plains of Santa Clara, altitude 220 meters, *Donnell Smith*, flowers, March, 1894 (Donnell Smith Herbarium no. 4820); Suerre, plains of Santa Clara, altitude 300 meters, *Donnell*



FIG. 30.—Leaf of *Cyclanthera langaei*.

*Smith*, flowers, February, 1896 (Donnell Smith Herbarium no. 6523); on bushes along Rio Pedregoso at El Copey, altitude 1,800 meters, *Tonduz*, flowers and fruits, April, 1898 (Instituto fis.-geog. Costa Rica no. 12495); pastures at the foot of the Turrialba Volcano, altitude 2,400 meters, *Pittier*, flowers, January 1, 1899 (Instituto fis.-geog. Costa Rica no. 13228); on bushes around Nicoya, altitude 300 meters, *Tonduz*, fruit, January, 1900 (Instituto fis.-geog. Costa Rica no. 13509); Chiripó Farm, Zent Plains, altitude 50 meters, *Pittier*, flowers, January, 1900 (Instituto fis.-geog. Costa Rica no. 16067).

*Cyclanthera langaei gracillima* Pittier, subsp. nov.

Stems, petioles, tendrils and rachis of the male inflorescences very slender and elongate. Leaves rather large; lateral leaflets usually bilobate, the middle one long and narrow.

COSTA RICA: Hedges at Ochomogo, altitude 1,500 meters, *Tonduz*, flowers, October, 1896 (Instituto fis.-geog. Costa Rica no. 10904).

5. *Cyclanthera costaricensis* Cogn. Diag. Cucurb. 2 (1877), 73.

COSTA RICA: San José (Oersted no. 23, Copenhagen Herb.). Not found since.

5a. *Cyclanthera costaricensis angustiloba* Cogn. loc. cit.

COSTA RICA: Ujarrás, altitude about 1,000 meters (Oersted 24, Copenhagen Herb.). Not found since.

6. *Cyclanthera explodens* Naud. Ann. Sci. Nat. IV. 12: 160. 1839.

General distribution: Northern Andes of South America, in Ecuador, Colombia, and Venezuela; Western Central America to El Salvador.

COSTA RICA: Bushes at La Verbena near San José, about 1,200 meters above sea-level, *Pittier & Tonduz*, flowers and fruit, December, 1894 (Instituto fis.-geog. Costa Rica no. 9088, type); San Francisco de Guadalupe near San José, altitude 1,200 meters, *Tonduz*, flowers and fruit, December, 1895 (Instituto fis.-geog. Costa Rica no. 9826).

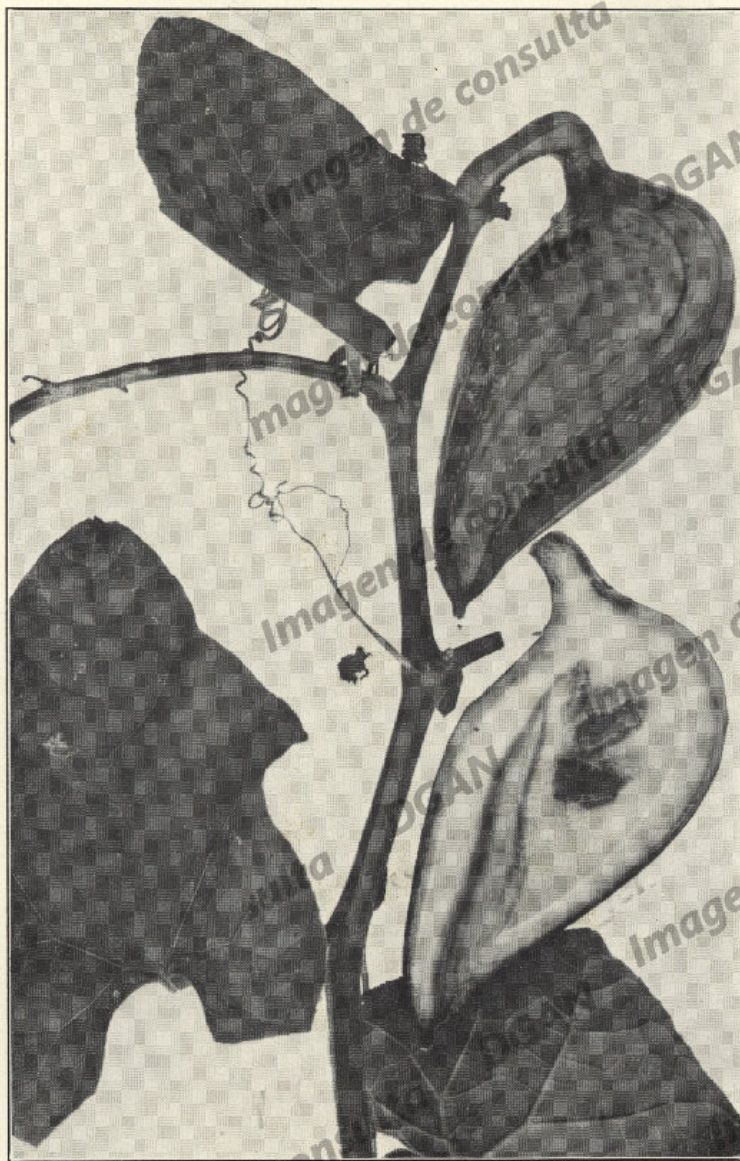
#### ELATERIOPSIS.

In 1872 Doctor Ernst discovered in Venezuela a new cucurbitaceous plant, which he placed between *Elaterium* and *Hanburya* under the name of *Elateriopsis caracasana*.<sup>a</sup> In this genus, the stamens are 5 (or sometimes 4), 4 of them being connate in two pairs, thus reducing the apparent number to 3; the stigmas are distinctly 3-lobate and the seeds rather large and flattened with a thin, sinuate margin. These characters are in themselves sufficient to segregate *Elateriopsis* as a generic unit, so that, notwithstanding his rather conservative tendencies, Mr. Cogniaux felt first inclined, in 1877,<sup>b</sup> to uphold it, and even increased it by one species (*E. macrostoma*), transferred from *Momordica*. But in 1881, the same author receded from the former position and amalgamated *Elateriopsis* with *Cyclanthera* as a mere

<sup>a</sup> See Flora 56: 257. 1873.

<sup>b</sup> Diag. Cucurb. 2: 82. 1877.





ELATERIOPSIS OERSTEDII (COGN.) PITTIER.

section, now increased to six species.<sup>a</sup> If, however, it is remembered that *Cyclanthera* as a genus rests mainly on the peculiar structure of the andræcium, reduced to one stamen with a disk-like anther, while in *Elateriopsis* the same is formed of 5 stamens with sinuous anthers made up in a regular head, it will be at once evident that the fusion of the two genera is not justified, and that *Elateriopsis* has more affinities with the *Sicyoideae* than with the *Cyclantherae*. This is the view taken by Müller and Pax in the *Pflanzenfamilien*,<sup>b</sup> following which we restore the Costa Rican *Cyclanthera oerstedii* Cogn. to its true place under *Elateriopsis* in the revision below. In general appearance, as well as in details, it differs widely from any of our *Cyclantherae*, the fruit being the one exception: it is similar in appearance, although quite smooth, to that of *Cyclanthera*

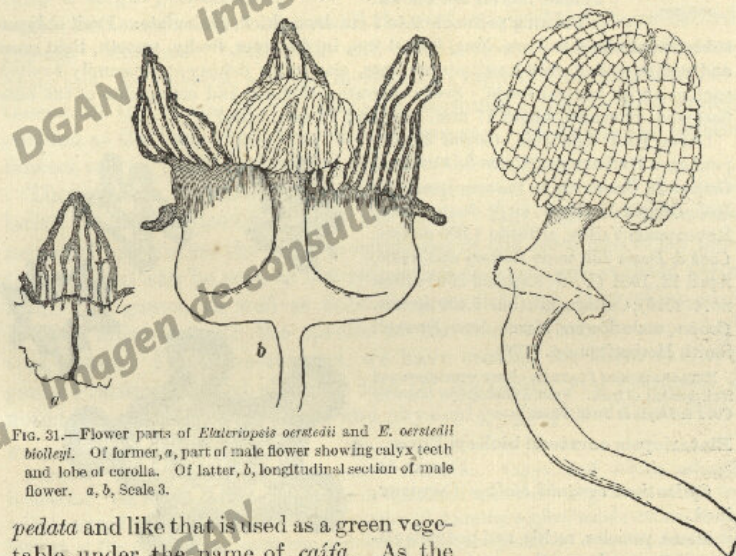


FIG. 31.—Flower parts of *Elateriopsis oerstedii* and *E. oerstedii* biolleyi. Of former, a, part of male flower showing calyx teeth and lobe of corolla. Of latter, b, longitudinal section of male flower. a, b, Scale 3.

FIG. 32.—Staminal head of *Elateriopsis oerstedii*. Scale 6.

*pedata* and like that is used as a green vegetable under the name of *caífa*. As the materials on which Mr. Cogniaux founded this species were incomplete, lacking female flowers and fruits, and we have been fortunate enough to obtain good specimens of the latter and also of the seeds, a new description of the plant is here given, female flowers remaining a desideratum.

*Elateriopsis oerstedii* (Cogn.) Pittier.

PLATE 19. FIGURES 31-34.

*Cyclanthera oerstedii* Cogn. in DC. Monogr. Phan. 3: 856. 1881.

Stems robust, deeply 5-sulcate, glabrous or slightly pubescent in the furrows, branching, densely foliated. Branchlets short.

Leaves rather large. Petioles 3 to 6 cm. long, slender, glabrous, striate. Leaf blades 6 to 15 cm. long, 7 to 18 cm. broad, more or less emarginate at base, angulate or

<sup>a</sup> DC. Monogr. Phan. 3: 330, 824. 1881.

<sup>b</sup> Engl. & Prantl, Pflanzenfam. 4<sup>e</sup>: 36. 1889.



obscurely trilobate, chartaceous, dark green, glabrous and minutely dotted above, paler and glabrous, except along the hairy, prominent ribs beneath; margin set with remote, minute teeth, the rather rounded angles and tips abruptly contracted into a short, obtuse point. Tendrils slender, 2-branched, the striate peduncle 2 to 5 cm. long.

Rachis of the male inflorescence robust, sulcate, glabrous, 5 to 20 cm. long, bearing from the middle 10 to 25 isolated flowers. Pedicels filiform, 8 to 23 cm. long, pubescent,<sup>c</sup> more or less erect. Calyx broadly campanulate, sparsely pubescent, 3 to 4 mm. deep, 6 to 7 mm. broad; teeth subulate, reflexed, 0.5 to 1 mm. long. Corolla greenish white, pubescent without, papillose within; lobes ovate-lanceolate, more or less rounded at tip, 5 to 6 mm. long, 4 to 5 mm. broad at base, thick on the brownish margin and more or less distinctly marked with 7 dark longitudinal bands. Filaments adnate in a single column, about 2.5 mm. long; anthers sessile, coherent, forming a depressed, rounded head, about 5 mm. in diameter. Female flowers not known.

Fruiting peduncle 2 to 3 cm. long, thick, geniculate. Fruit oblique, subconic, acute, 6 to 8 cm. long, 3 to 4 cm. in diameter, fleshy, smooth, light green and striate with darker longitudinal lines, elastically dehiscent, obscurely 3-celled, each cell with several seeds. Seeds obovate, attenuate and emarginate at the base, flattened, brownish, about 17 mm. long and 16 mm. broad.

COSTA RICA: San José, *Oersted* 20 (Copenhagen Herbarium); Cerro de Catalina, *Oersted* 18 (herb. cit.); Pacaca, near San José, *Oersted* 19 (herb. cit.); Juan Viñas, Reventazon Valley, altitude 1,000 meters, *Cook & Doyle* 221, male flowers and fruits, April 22, 1903 (U. S. National Herbarium no. 474016); Cartago, altitude 1,400 meters, *Cooper*, male flowers, March, 1888 (Donnell Smith Herbarium no. 5776).

EXPLANATION OF PLATE 19.—Stem with leaves and fruit; section of fruit. From a photograph taken by *Cook & Doyle* at Juan Viñas.

*Elateriopsis oerstedii* *biolleyi* Pittier.

FIGURE 31.

*Cyclanthera oerstedii biolleyi* Cogniaux, ined.

Stems, petioles, rachis, and pedicels glabrous; flowers larger than in type; calyx minutely pubescent, woolly-tomentose on the margin; teeth 2 to 2.5 mm. long. Lobes of the corolla longer and narrower (9 mm. long, 4 mm. broad).

<sup>a</sup> Cogniaux's description reads: "Pedicelli filiformes, patuli, glabri, ad medium articulati, 8 to 15 mm. longi." We fail to see the articulation in any of our specimens; in a few cases there are traces of a diminutive bractlet, but this is far from being a general character; also the pubescence of the pedicels is conspicuous. As to the dimensions and other numerical data, they are at variance in both descriptions almost from beginning to end. It may be argued, moreover, that the able monographer of the Cucurbitaceae did not take sufficient notice of the striking structural differences in the stems of *Cyclanthera* and *Elateriopsis*, which are shown in the cross-sections here reproduced (fig. 34).

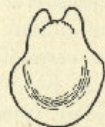


FIG. 33.—Seed of *Elateriopsis oerstedii*. Natural size.

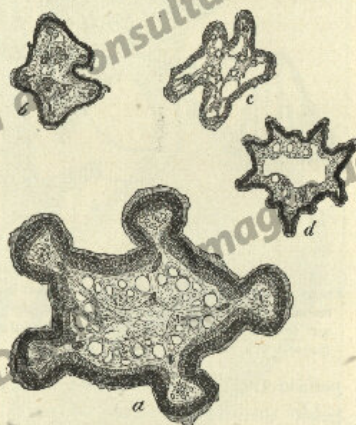


FIG. 34.—Transverse sections of stems of *Elateriopsis*, *Cyclanthera*, and *Frantzia*. a, of *E. oerstedii*; b, of *C. londuzii*; c, of *C. lanquei*; d, of *F. pittieri*. a-d. Scale 6.

COSTA RICA: At the fork of the Puerto Viejo and Sarapiquí rivers, in the northern plains, altitude about 100 meters, *Biolley*, male flowers, January, 1893 (Instituto fis.-geog. Costa Rica no. 7418).

#### FRANTZIA, A NEW GENUS.

Mr. Cogniaux also published in 1892<sup>a</sup> the diagnosis of a new Costa Rican Cucurbitaceae, which, on account of superficial appearances only, he placed near his *Cyclanthera oerstedii*. This is his *C. pittieri*. On examining the numerous specimens distributed under that name by the Instituto fisco-geográfico, most of which are in the National Herbarium, it is found that they represent at least two distinct species and furthermore that they can not belong to the genus *Cyclanthera*, on account of the 5 anthers, nor to *Elateriopsis*, since the ovary contains a single pendulous ovule. The fruits are not oblique and the ovate, flattened seeds do not recall those of either of the above-named genera. Moreover, both male and female flowers exhibit a feature quite new, as it seems, among the related Tropical American Cucurbitaceae, in the shape of ten nectaries forming a depressed-rounded cushion at the base of the reproductive organs. The male and female flowers scarcely differ except in the sexual features.

These plants are closely related to *Sechium* on account of the similarity of the andræcium and the fruit. But their cushion-like nectarial apparatus, the relative smallness of the seed, and other particulars that can be seen in the respective descriptions exclude them from that genus, as well as from *Sicyos*, although they show also marked affinities with the species of the section *Atractocarpus*<sup>b</sup> of that genus. For these reasons, we have created for them the new genus *Frantzia*, named after the late Dr. Alexander von Frantzius, a noted investigator of the fauna and physical geography of Costa Rica.

*Frantzia* Pittier, gen. nov.

Flowers monœcious. Male inflorescence racemose. Calyx and corolla adnate, rotaceous. Calycinal teeth 5, triangular or thick and rounded. Segments of the corolla 5, spreading, ovate-lanceolate. Nectaries 10, forming a spheroidal cushion at the bottom of the corolla, and each one opening on the periphery by a low arched hole. Stamens 5, the filaments connate in a single column; anther cells more or less free and forming an irregular head. Pollen grains globose, minutely echinate. Pistillodium none. Female flowers solitary in the same axils with the male ones. Calyx and corolla as in the latter. Openings of the nectaries larger. Staminodes none. Ovary fusiform, 1-celled; ovule single, pendulous from the apex of the cell; style short; stigma capitate, 4-lobed. Fruit fibrous or woody, ovate-rounded, more or less acute, 1-seeded, apparently indehiscent. Seed ovate, depressed, with smooth testa.

Two or more Costa Rican herbaceous species, climbing, glabrous or almost so; leaves deeply emarginate at the base, palminerve, entire or more or less deeply 3 to 5-lobate. Flowers small, whitish or yellowish.

<sup>a</sup> Bull. Soc. Bot. Belg. 30: 276. 1892.

<sup>b</sup> In *Sicyos warmingii* Cogn., a *Eusicyos*, we even note at the bottom of the corolla a cupuliform appendage that looks singularly like a nectarial structure of the same class as the one found in our Costa Rican plants. See Mart. Fl. Bras. 6<sup>a</sup>: pl. 33. 1878.



Type species *F. pittieri*.  
 Leaves partly hairy, densely covered with conspicuous white dots, and narrowly 3-lobate. . . . . *F. montana*.  
 Leaves quite glabrous, entire or broadly 3 to 5-lobate. . . . . *F. pittieri*.

1. *Frantzia montana* Pittier, sp. nov.

FIGURES 35, 36.

A climbing vine. Stems rather slender, sulcate, glabrous.  
 Petioles slender, striate, smooth, 3 to 4 cm. long. Leaf blades 8 to 10 cm. long, 7 to 12 cm. broad, coriaceous, dark green, glabrous, except on the main ribs, and densely

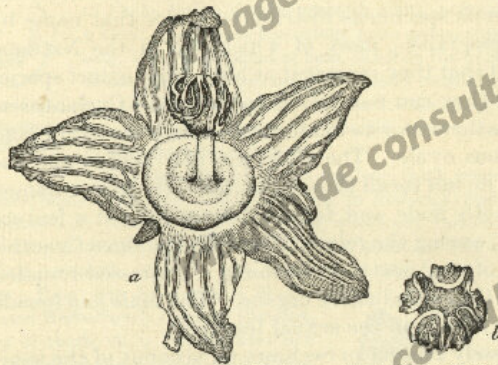


FIG. 35.—Flower and anthers of *Frantzia montana*. a, Male flower; b, anthers. a, b, Scale 6.

covered with white dots above, paler or brownish and more or less hairy-scabrous beneath, broadly emarginate, divided almost to the base into 3 more or less parted lobes; main ribs hairy above, prominent and more or less scabrous-puberulent, as are the primary veins, on the lower face; median lobe varying from narrowly lanceolate (7.5 cm. long, 1.5 cm. broad) to obovate-acuminate (8 cm. long, 3 cm. broad); lateral lobes broader, more or less

falciform and auriculate; interlobular sinuses sometimes very narrow, sometimes broadly open; margins more or less sinuate-dentate. Tendrils 3 to 4-fid, glabrous, the peduncle striate, about 2 cm. long.

Rachis of the male inflorescence 15 to 28 cm. long, rather slender, striate, glabrous. Flowers in sessile or short-stipitate clusters; pedicels filiform, smooth, 3 to 5 mm. long. Calyx cupuliform, about 4 mm. in diameter, sparsely covered with short, appressed hairs; teeth rounded-subulate, 0.5 to 0.7 mm. long. Nectaries forming a spongy,

transparent cushion; walls dividing the nectary cells not visible. Corolla pale yellow, sparsely covered outside with short, brownish hairs, smooth or slightly papillose inside; lobes broadly lanceolate, rounded at tip, 3.5 mm. long, 2 mm. broad, bearing 7 brown, salient, longitudinal striae. Staminal column 1 to 1.2 mm. long; anthers more or less coherent, in a head about 1.7 mm. in diameter. Female flowers not seen. Fruit ovoid, about 4.5 cm. long and 3 cm. in diameter, echinate; spines hard, acute, arcuate. Seed compressed, smooth, 2 cm. long, 1 cm. broad.

COSTA RICA: Climbing on old trunks in the pastures on the slopes of the Turrialba Volcano, at an altitude of 2,500 meters, Pittier, flowers and fruits, January 1, 1899 (Instituto fis.-geog. Costa Rica, no. 13192, type); bushes at La Laguna del Copey, 1,800 meters above sea level, Tonduz, flowers, April, 1898 (Instituto fis.-geog. Costa Rica no. 12223).

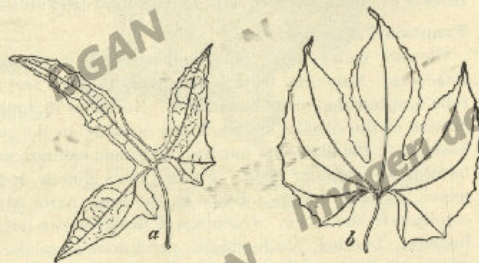


FIG. 36.—Leaves of *Frantzia montana*. a, b, Extreme forms. Scale 6.

2. *Frantzia pittieri* (Cogn.) Pittier.

FIGURES 37, —, 39.

*Cyclanthera pittieri* Cogn. Bull. Soc. Bot. Belg. 30: 275. 1891.

Plant entirely glabrous. Stems slender, branched, densely foliose, 10-sulcate, smooth.

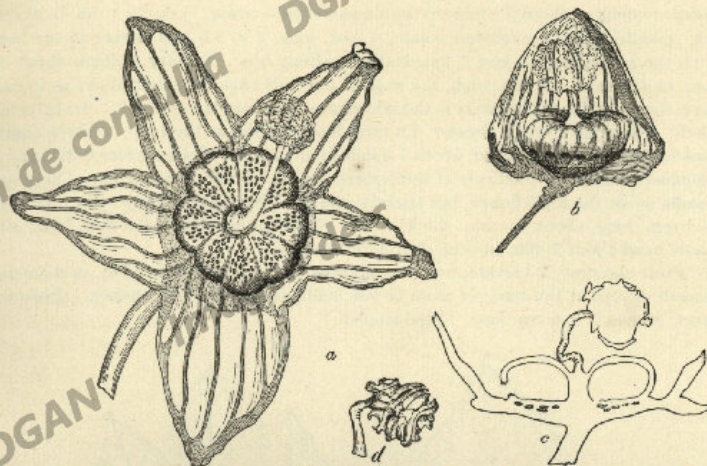


FIG. 37.—Male flower of *Frantzia pittieri* with parts. a, Flower; b, transparent bud; c, transverse section, showing nectaries; d, stamens. a-d, Scale 6.

Petioles striate, 3 to 5 cm. long. Leaf blades about 10 cm. long, 9 to 12 cm. broad, deep green above, paler beneath, densely and minutely white-dotted above, entire

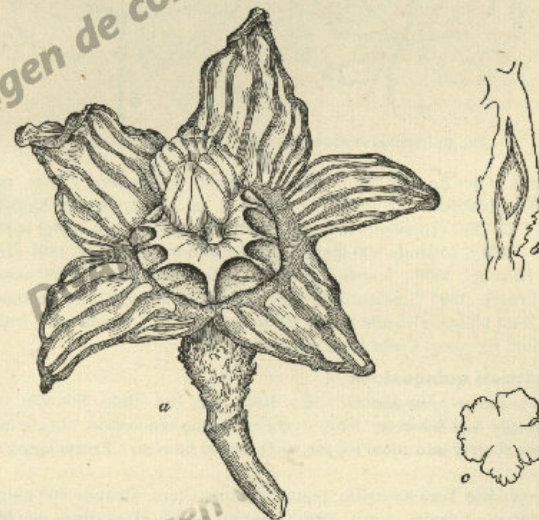


FIG. 38.—Female flower of *Frantzia pittieri* with parts. a, Flower; b, ovary, longitudinal section, showing pendulous ovule; c, transverse section of the 4-lobed stigma. a-c, Scale 6.

and more or less rhomboidal or subtrilobate, deeply emarginate at the base; margin wide-toothed, the teeth broad and obtuse. Tendrils 3 to 5-branched, the common peduncle rather slender, 2 to 4 cm. long, the branches filiform.



Rachis of the male inflorescence 10 to 25 cm. long, slender, flowered almost from the base; flowers very numerous, in 14 to 18 alternate clusters; pedicels filiform, 3 to 7 mm. long. Calyx rotaceous, about 5 mm. in diameter, the teeth 1 mm. long, thick, obtuse, emerging about 0.5 mm. in the sinuses of the corolla. Corolla 1 cm. in diameter, spreading; lobes ovate-lanceolate, 4 mm. long, 3 to 3.5 mm. broad at the base, with thickened margin and 7 longitudinal salient ribs. Nectary cushion about 3.5 mm. in diameter, 1.2 mm. high, the walls of the cells appearing from above as 10 dark rays, corresponding alternately to the midveins of the corolla lobes and to the calycinal teeth. Staminal column slender, 2.6 mm. long, thicker at the base; anthers sessile, coalescing in a rounded head, about 1.5 mm. in diameter. Pollen grains 0.087 mm. in diameter, echinate. Pedicels of the female flowers 3.5 mm. long, thick. Calyx and corolla as in the male flower, but slightly smaller. Nectaries widely open. Ovary 3 to 4 mm. long, about 1.5 mm. thick, with a rugose surface; style 0.8 mm. long; stigmatic head about 2 mm. in diameter, 4-lobate.

"Fruit obscurely 2-valvate, ovate-rounded, 4 to 6 cm. long, 3 to 4 cm. in diameter, smooth except at the base, or more or less echinate on its whole surface. Peduncle erect, striate, 3 to 5 cm. long. Seed smooth."

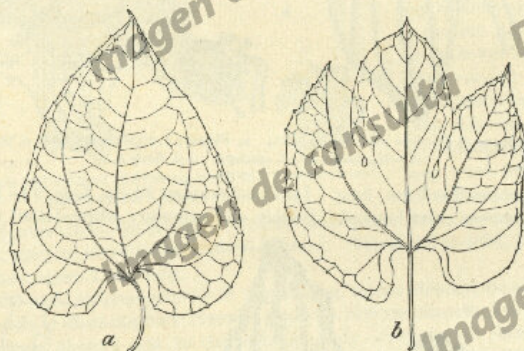


FIG. 39. Leaves of *Frantzia pittieri*. a, b, Two types. a, b, Scale 1/2.

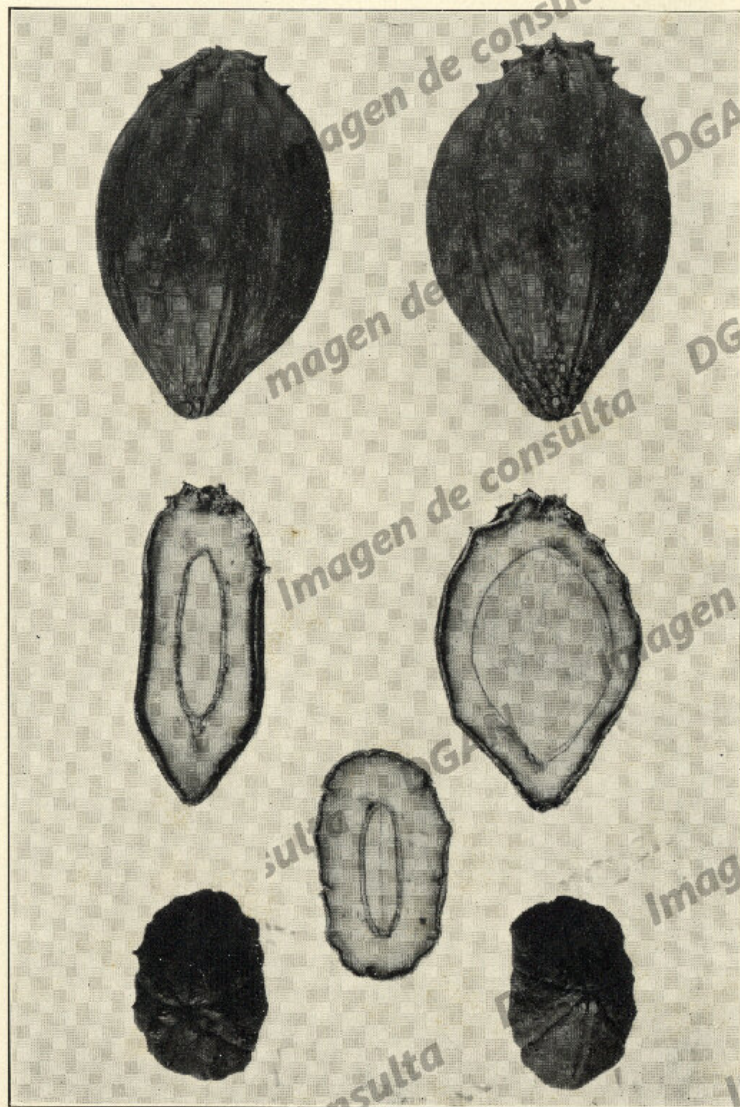
COSTA RICA: Carrillo, Rio Sucio Valley, altitude 300 meters, *Pittier*, male flowers, July 8, 1889 (Instituto fis.-geog. Costa Rica no. 1212); same locality, *Tonduz*, flowers, May 12, 1890 (Instituto fis.-geog. Costa Rica no. 2511); along path at El General, Diquís Valley, altitude 800 meters, *Pittier*, flowers, January, 1891 (Instituto fis.-geog. Costa Rica, no. 3506); forests of Xiróres, Talamanca, altitude 100 meters, *Tonduz*, flowers, February, 1895 (Instituto fis.-geog. Costa Rica no. 8334); on bushes at Chirripó Farm, Zent plains, altitude below 100 meters, *Pittier*, flowers and fruits, January, 1900 (Instituto fis.-geog. Costa Rica no. 16072).

***Frantzia pittieri* quinqueloba.**

*Cyclanthera pittieri quinqueloba* Cogn. Bull. Soc. Bot. Belg. 30: 276. 1891, in part. Leaves deeply 3 or 5-lobate; lobes ovate or oblong-lanceolate, obtuse or acuminate. Male racemes shorter and more robust, with larger flowers. Fruits larger, with longer peduncles.

COSTA RICA: Rio Toro Amarillo, plains of Santa Clara, altitude 300 meters, Donnell Smith, flowers and fruits, April, 1896 (Donnell Smith Herbarium no. 6520); bushes in Tufs Valley, altitude 650 meters, *Tonduz*, flowers, November, 1897 (Instituto fis.-geog. Costa Rica no. 11410; but this specimen may belong to a distinct species).





POLAKOWSKIA TACACO PITTIER.

## POLAKOWSKIA, A NEW GENUS.

Among the unnamed materials of the collection of the Instituto físico-geográfico we also found specimens of a plant the fruit of which is quite popular in Costa Rica as a vegetable and known under the name of *tacaco*, derived from one of the native languages.<sup>a</sup> At first sight this plant, which can be considered as semicultivated, since it is tolerated wherever found near or in cultivated fields, seems to come very close to the well known *Sechium edule*. But on examining the male flowers, it is found that they are provided with 10 pouch-like nectaries, sunk into the bottom of the corolla and protruding on the outer side at the base of the calyx. This feature is also characteristic of the Mexican genus *Sechiopsis* Naud.; but while in our plant both male and female flowers are pentamerous and the latter solitary in the axils of the leaves, the female flowers in *Sechiopsis* are trimerous and form small umbels by the side of the male racemes. The fruits of the present species, moreover, are ovate, flattened, and covered with soft spines, and not triangular and winged. Here, then, we have again obvious reasons for creating a new genus, which we will dedicate to Dr. H. Polakowsky, one of the earlier students of the flora of Costa Rica and a well-known writer on subjects related to Central and South America.

*Polakowskia* Pittier, gen. nov.

Flowers monœcious. Male inflorescence racemose. Calyx and corolla connate, broadly campanulate. Calycinal teeth, small, subulate. Segments of the corolla 5, spreading, ovate-triangular. Nectaries forming 10 pouch-like pits at the bottom of the flower. Stamens 5, the filaments coherent in a slender, elongate column; anthers free, more or less spreading, one of them single, 4 connate in two pairs; anther cells diversely conduplicate and forming a depressed head. Pollen grains globose, minutely muricate, obscurely 8-sulcate. Pistillodium none. Female flowers solitary in the same axils with the male ones and smaller than these. Calyx and corolla coherent, thick, rotaceous, the former 5-toothed, the latter with 5 ovate-triangular lobes. Ovary fusiform, 1-celled, slightly setose at the base; style very short; stigma capitate, obscurely 5-lobed; ovule single, pendulous from the apex of the cell. Fruit rather fleshy, fusiform, depressed, 5-sulcate, monosperm, with soft spines at the base; dehiscence 2-valvate. Seed elliptic, compressed, the testa subligneous, smooth and with subacute margins.

A Costa Rican plant, herbaceous or suffruticose, climbing, glabrous. Roots fleshy. Stems perennial. Leaves membranous, deeply emarginate, palmate-nerved, slightly 3-lobate. Tendrils 5-fid. Flowers small, of a sallow white color. Fruit medium-sized, edible.

*Polakowskia tacaco* Pittier, sp. nov.

PLATE 20. FIGURES 40, 41.

Stems slender, branched, densely foliose, sulcate, smooth, 2 to 6 meters long.

Petioles slender, striate, smooth, 3 to 8 cm. long. Leaves 5 to 9 cm. long, 5 to 11 cm. broad, deep green, densely covered with minute white dots above, paler beneath, quite glabrous; margin obscurely sinuate-dentate; lobes not deeply cut, acuminate, the middle one longer and broader. Tendrils rather thick, usually 5-branched.

<sup>a</sup> Probably from the *güetará*, although the name is used by the Bribri of Talamanca for the fruits of *Frantzia pittieri* (Tonduz in sched.). This fact seems to point to a very ancient use as a food plant.



Main peduncles of the male racemes robust, striate, often branched, 6 to 20 cm. long; pedicels filiform, 1 to 2.5 cm. long; flowers not less than 50 in each raceme and divided into several whorls. Tube of the calyx very short (1.5 mm.), teeth subulate,

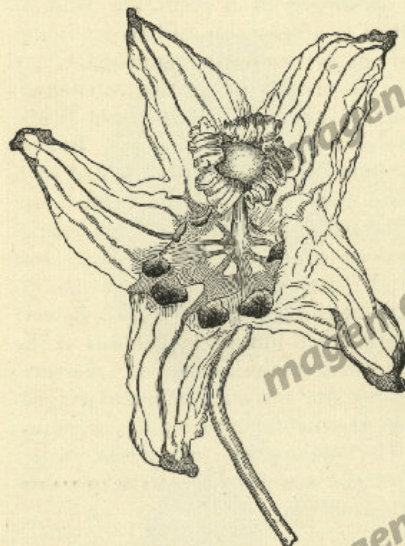


FIG. 40.—Male flower of *Polakowskia tacaco*. Scale 6.

1 mm. long. Segments of the corolla spreading, longitudinally veined, 4 mm. long, 3 mm. broad. Nectaries pouch-like, with broad openings. Staminal column almost 2 mm. long; anthers spreading, nearly sessile, 4 forming pairs and the fifth free. Pollen grain 0.080 to 0.083 mm. in diameter. Pedicels of the female flowers 3 mm. long. Calyx scarcely 2 mm. long, the subulate teeth 1 mm. long. Segments of the corolla thick, papillose inside, broadly ovate-triangular, 1.2 mm. long, 1.5 mm. broad. Nectaries none. Ovary 4 mm. long, about 1.5 mm. thick, slightly setose at the base; stigma capitate, 2 mm. in diameter.

Fruiting peduncles 3 to 4 cm. long. Fruits green, 4 to 6 cm. long, 1.5 to 2.5 cm. thick, sparsely aculeate at the base, attenuate at both ends and 5-sulcate. Seed elliptic, 27 mm. long, 15 mm. broad, about 4 mm. thick, the testa hard with subacute margins.

COSTA RICA: Around San José, wild or semicultivated on account of its fruits, used for culinary purposes, altitude about 1,200 meters, *C. Wercklé*, flowers and fruits,

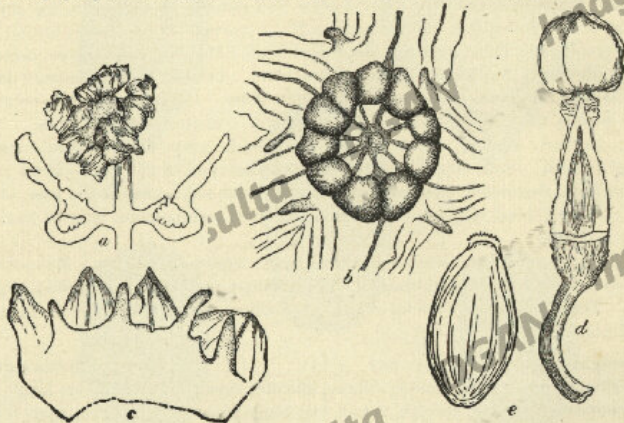


FIG. 41.—Floral parts and seed of *Polakowskia tacaco*. a, Vertical section of male flower, showing stamens and nectaries; b, calyx as seen from below, showing teeth and pouch-like nectaries; c, calyx and corolla of young female flower, cut open and spread; d, pistil partially cut open to show pendulous ovules; e, seed. a-d, Scale 6; e, natural size.

October, 1902 (Instituto fis.-geog. Costa Rica no. 16674; U. S. National Herbarium no. 592346, 592347 type, both sheets from the same individual).

EXPLANATION OF PLATE 20.—Fruit, external views and sections. From material received from Costa Rica.

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