



*VIROLA WARBURGII* PITTIER.

# NEW OR NOTEWORTHY PLANTS FROM COLOMBIA AND CENTRAL AMERICA—5.

By HENRY PITTIER.

## INTRODUCTION.

Another installment<sup>1</sup> is here offered of results obtained by the author within his special field. There are descriptions of new species in several families and group studies in the Caesalpiniaceae and Bombacaceae.

## MYRISTICACEAE.

### A NEW SPECIES OF VIROLA AND AN OLD ONE OF COMPSONEURA.

*Virola warburgii* Pittier, sp. nov.

PLATE 57.

Section *Amblyanthera*. A tree 15 to 30 meters high, the trunk 25 to 60 cm. in diameter at the base. Trunk straight, percurrent; ramification radiate; crown pyramidal. Branchlets at first densely ferruginous-tomentose, glabrate in age, dark brown, almost shiny.

Leaves variable in size, leathery. Petioles 1 to 2 cm. long, 2 to 4 mm. thick, densely ferruginous-tomentose. Leaf blades 9 to 35 cm. long, 3 to 12.5 cm. broad, elliptic, subcuneate, rounded or subemarginate at base, mostly long-acuminate at tip, smooth above (except on costa), ferruginous-tomentulose beneath at first but later sparsely covered with brown stellate hairs; costa and primary veins slightly prominent above, the former often brown-tomentose at first and quite prominent and densely tomentose beneath; veins 10 to 15, arcuate and not directly connected along the margin; transverse veinlets almost parallel, impressed above on the older leaves only, prominent but partly concealed by the tomentum beneath.

Inflorescences axillary, amply paniculate, the rachis quite densely ferruginous-tomentose. Male inflorescence: panicles about 10 cm. long and broad; peduncles 1.5 to 3 cm. long, up to 3 mm. thick; floral fascicles provided at base with several ovate-rounded, caducous bracteoles; pedicels about 1.3 mm. long; perianth about 1.7 mm. long, funnel-shaped, 3-fid, densely ferruginous-tomentose outside; anthers usually 6, 0.5 mm. long, shorter than the thick staminal column. Female inflorescence: panicles also about 10 cm. long, but branches apparently less developed; flowers not known.

Fructiferous racemes bearing about 10 nuts, the rachis subglabrous. Peduncle 2 cm. long and 4 mm. thick; pedicels 6 to 8 mm. long. Fruit obovate or subpyriform, 16

<sup>1</sup>The preceding numbers of this series occur in the Contributions as follows: 12: 171-181. pls. 18-19. figs. 11-19. January 27, 1909. 13: 93-132. pls. 17-20. figs. 2-41. June 11, 1910. 13: 431-466. pls. 78-96. figs. 57-91. January 5, 1912. 18: 69-86. pls. 42-56. figs. 76-87. April 16, 1914.

mm. long and 13 to 14 mm. in diameter, covered outside with a thick, fugacious, ferruginous tomentum; pericarp 1.3 mm. thick. Aril deep pink, divided for about two-thirds of its length. Seeds 12 mm. long, 9 mm. in diameter, obovoid, pointed at the base; testa thin, grayish outside and sulcate.

Type in the U. S. National Herbarium, nos. 678554-5, male flowers, collected in forests along the Chagres River above Alhajuela, Province of Panama, Panama, May 12, 1911, by H. Pittier (no. 3505).

Represented also by nos. 715464-6, imperfect female flowers and ripe fruit, collected in woods around San Felix, eastern Chiriquí, Panama, December 22, 1911, by H. Pittier (no. 5255).

*Virola warburgii* belongs to the section *Amblyanthera* Warb. and stands between the Brazilian species *V. carinata* and *V. venosa*. The seeds from Chiriquí mentioned by Dr. Warburg in the appendix to the description of *V. panamensis*<sup>1</sup> agree with those of this species. According to that monographer, the chalaza is very deep below the apex and forms an umbilical prominence, a scarcely impressed raphe extends to the hilum, and the ruminant endosperm contains fats and crystalloids but no starch. These details I could not verify. The common name of the tree is "bogamani," and not "bogobane."

EXPLANATION OF PLATE 57.—Leaves and fruit; fruit after dehiscence and aril detached. Material from same tree as type specimen. All natural size.

**Compsoeura costaricensis** Warb. Repert. Nov. Sp. Fedde 1: 71. 1905. PLATE 58.

A middle-sized tree with pyramidal crown. Branchlets glabrous, 2 to 4.5 mm. thick, brownish green.

Leaves petiolate, large, membranous, quite glabrous, light green and lustrous above, paler beneath. Petioles 1 to 1.5 cm. long, broadly canaliculate. Leaf blades oblong, 17 to 28 cm. long, 5 to 11 cm. broad, rounded and abruptly cuneate at the base, rounded and abruptly narrowed into an obtuse acumens at tip; margin slightly undulate. Costa and primary veins prominent below, the latter 9 to 12, arcuate, parallel, hardly confluent along the margin; minor veins transverse, almost parallel, distinctly prominent on both faces.

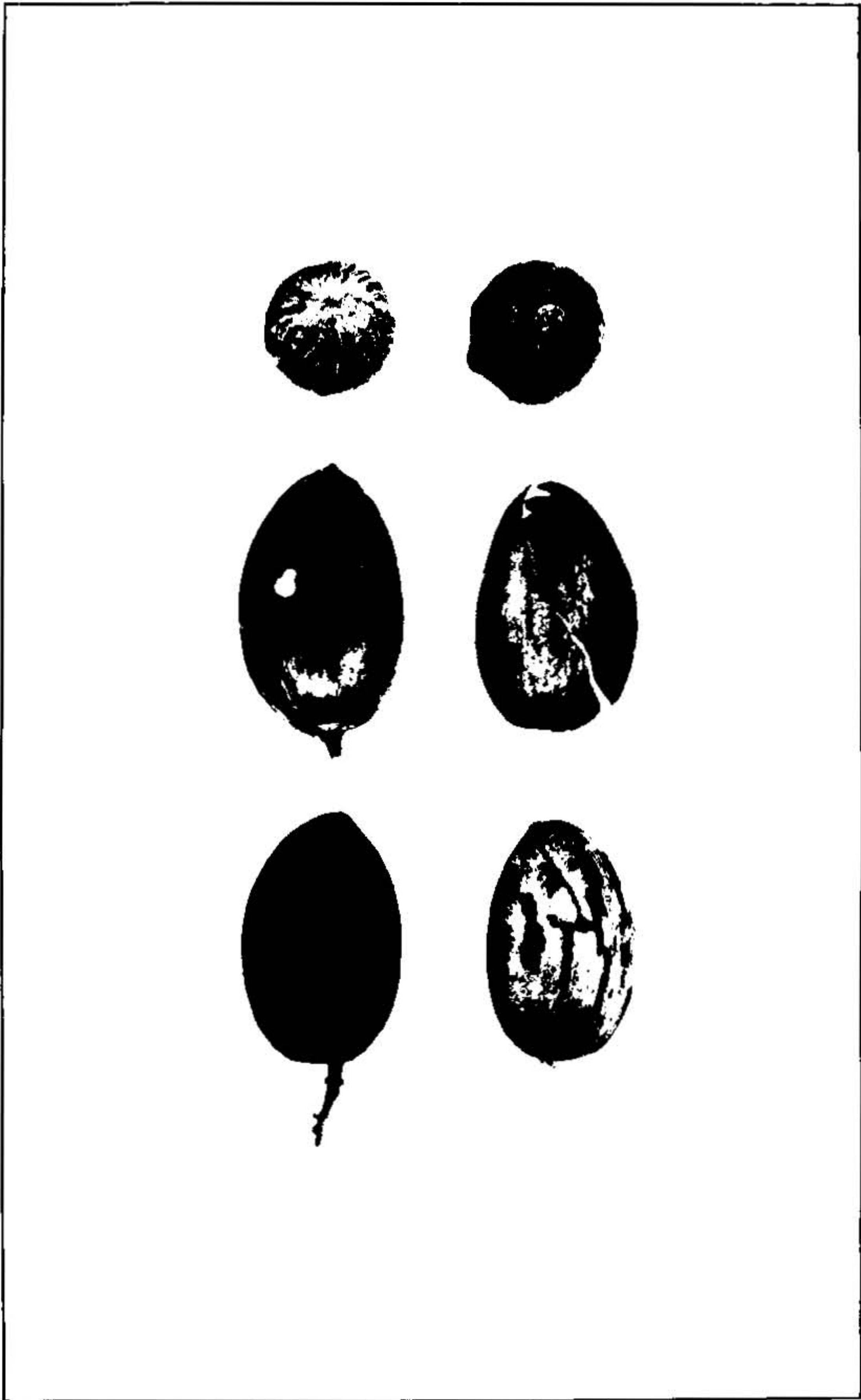
Inflorescences axillary, often geminate, racemose, 1.5 to 3 cm. long, the branchlets 2 to 3 mm. thick; flowers few, clustered at the ends of the racemes (?), their characters not known.

Fruit usually 1, sometimes 2 or 3, in each raceme, ovate, 2.5 to 3.2 cm. long, 2 cm. in diameter, borne on a slender pedicel 7 mm. long, the pericarp yellowish green, smooth. Aril pale yellow, continuous and completely wrapping the seed except at the apex, there open and short-lobate. Perisperm lignose, the surface smooth, pinkish gray with dark brown lines and irregular elongate spots radiating from the basal hilum; endosperm hard, white, hardly ruminant. Embryo small, basal.

COSTA RICA: Plains of San Carlos, *Koschny* (in Herb. Berlin, type); forests of the Río Naranjo, at the southern base of the Dota Mountains, fruit, March, 1893, *Tonduz*, Inst. Fís. Geogr. Costa Rica 7700 (U. S. Nat. Herb.).

The above is an emended translation of Dr. Warburg's original description. Notes taken by me on the occasion when Mr. Tonduz collected his specimens, indicate a middle-sized tree with a habit like that of *Virola*. The leaves are much larger than stated by Dr. Warburg and, judging from the fruit-bearing rachis in our specimens, the racemes are flowered from the base (what I take for remnants of pedicels may, however, be aborted branchlets). The pedicellate nuts attain a length of 3.2 cm. The locality where *Koschny* collected is given as San José, whereas it should read San Carlos; further, the text, after the description of the aril should read "perispermo"

<sup>1</sup> Nov. Act. Acad. Caes. Leop. Carol. 68: 185. 1897.



FRUIT OF *COMPSONEURA COSTARICENSIS* WARB.

instead of "pericarpio." This perisperm, by the way, is remarkable on account of its variegated coloring and is in itself sufficient to distinguish the species.

It is hardly necessary to state here that Dr. Warburg contradicts himself when he asserts that this is the first *Compsoeura* species known in Central America, after citing *C. sprucei* as a native of Tabasco. Although it is very doubtful whether the Mexican tree is identical with Spruce's species, there is no question as to its belonging to *Compsoeura*.

EXPLANATION OF PLATE 58.—Details of fruit, from the Tonduz specimen cited. Natural size.

### CAESALPINIACEAE.

#### THE GENERA *BROWNEA* AND *BROWNEOPSIS* AS REPRESENTED IN PANAMA, COLOMBIA, AND VENEZUELA.

##### NEED OF NEW TREATMENT.

The neotropical genus *Brownea* Jacq. is, as a rule, scantily represented in American herbaria. In the U. S. National Herbarium only 3 well authenticated species were represented, the single specimen of one of these being in very poor condition and, of another, collected in the greenhouses of the Department of Agriculture. The remaining few specimens, all wrongly, or at least doubtfully, identified, were received from the Botanical Garden of Buitenzorg (Java).

In the course of my botanical explorations in Central and South America, I have succeeded in obtaining no less than 8 distinct species which, together with one of the 3 species mentioned above, are fully described in the present paper.

The systematic treatment of *Brownea* has been made very difficult on account of the unsatisfactory characterization of Jacquin's types. The only way to identify most of Jacquin's species will be by directly comparing the new material with his types at Vienna. Distinct species have also been repeatedly confused and it is by no means certain that the same forms have not been described under two or more names. That this was the opinion of the lamented Dr. Taubert is indicated by his estimate of only 10 species for the genus, in the *Pflanzenfamilien*, at a time when at least 14 nominal species had already been published.

A general revision of the genus undoubtedly is needed, and it is with the hope that it may be helpful to him who may undertake the task that the present contribution has been prepared.

##### BROWNEA VERSUS HERMESIAS.

Under the name *Hermesias*, Loeffling<sup>1</sup> described a plant collected by himself in his travels through the region between the Orinoco and Unare rivers, about December, 1754. The plant is undoubtedly a *Brownea*, but no specific name is given, and from the description it can not be clearly identified with any of the known species.

<sup>1</sup> *Iter Hisp.* 278. 1758.

Jacquin, on the other hand, published in the *Enumeratio* (1762) his *Brownea coccinea*, which is completely described in the *Stirpium* (1788). This is also a Venezuelan plant, and so are the 5 additional species considered in the *Fragmenta* and *Collectanea* of the same author. In 1774, J. P. Berg described his *B. rosa-del-monte*, basing it upon specimens collected at Porto Bello, Panama.

It is very difficult, not to say impossible, to identify Loeffling's *Hermesias* with any of the 6 Venezuelan species of Jacquin. The idea of making that name a synonym of *B. rosa-del-monte* is equally inadmissible, since the latter is, so far as we know, restricted to Panama and could not have been collected by the author of *Hermesias*.

There is evidently no type available for this generic name, or, in other words, the name has no standing. Consequently *Brownea* has to be preserved. This is much more convenient, because under the latter name several of the species have been and are still cultivated in greenhouses or tropical gardens, on account of the unusual beauty of the flowers. These species have been crossed and new horticultural varieties put on the market. A change of generic name at this time would then not only be unwarranted for taxonomic reasons but would also cause useless confusion in the practical field of floriculture.

This was clearly understood by the editors of the *Pflanzenfamilien*, when in the *Nachträge*, published in 1896, they reversed the decision of the late Dr. Taubert, who, following O. Kuntze, had adopted *Hermesias* in his treatment of the *Leguminosae*.<sup>1</sup>

#### THE SPECIES OF BROWNEA.

Up to the present, 15 species of *Brownea* have been described, to which 2 others, which I consider to be new, are here added. The following is the complete list, with the date of publication, and origin of the types.

<i>Brownea coccinea</i> Jacq.....	1762.	Venezuela.
<i>Brownea rosa-del-monte</i> Berg.....	1773.	Panama.
<i>Brownea grandiceps</i> Jacq.....	1789.	Venezuela.
<i>Brownea capitella</i> Jacq.....	1809.	Venezuela.
<i>Brownea latifolia</i> Jacq.....	1809.	Trinidad.
<i>Brownea leucantha</i> Jacq.....	1809.	Venezuela.
<i>Brownea racemosa</i> Jacq.....	1809.	Venezuela.
<i>Brownea speciosa</i> Reichenb.....	1825.	Trinidad.
<i>Brownea cauliflora</i> Poepp. & Endl.....	1845.	Amazonian Peru.
<i>Brownea guianensis</i> Klotzsch.....	1848.	British Guiana.
<i>Brownea ariza</i> Benth.....	1857.	Colombia.
<i>Brownea macrophylla</i> Linden.....	1863.	Colombia.
<i>Brownea negrensis</i> Benth.....	1870.	Northern Brazil.
<i>Brownea birschellii</i> Hook. f.....	1872.	Venezuela.
<i>Brownea neglecta</i> Taub.....	1891.	Origin doubtful.
<i>Brownea aroensis</i> Pittier.....	1916.	Venezuela.
<i>Brownea guaraba</i> Pittier.....	1916.	Venezuela.

<sup>1</sup> In Engl. & Prantl, *Pflanzenfam.* 3<sup>a</sup>: 145. 1894.

Of these 17 species, one, *B. guianensis* Klotzsch, which has been published in name only, is possibly identical with some of the Venezuelan types or with *B. negrensis*. I have not seen Jacquin's descriptions of the four species in the *Fragmenta*, but the descriptions in the *Prodromus* are certainly too scanty to be of any use. *B. neglecta* is a name only.

#### GEOGRAPHICAL DISTRIBUTION OF THE SPECIES.

The above list shows that out of 17 species, 10 were described originally from Venezuela. That country, then, has a right to be considered the cradle of the genus, so much the more as it is very probable that further researches in that little explored country will result in the discovery of new types. For instance, it may be stated that among about a dozen specimens remaining from Dr. Vargas's Herbarium, which I saved from utter destruction by bringing to Washington, there is a *Brownea* collected May, 1828, near Tocuyo, in the State of Lara, where it is known under the name of "palo de sangre." The leaves of this plant apparently do not agree with those of any of the described species. They are 2 to 6-jugate, with glandular but otherwise glabrous leaflets, much smaller than is usual in the genus, and long-pediceled flowers. Unfortunately the latter are all in such a fragmentary condition that no attempt could be made to analyze them. On the other hand, as already stated, it is not unlikely that the number of these Venezuelan species will have to be reduced after a careful examination of the types and of new material.

According to Grisebach, *Brownea latifolia* is also found in Trinidad, which has besides a supposed endemic type, *B. speciosa*, found by me, however, in Venezuela in 1913. *Brownea rosa* Griseb. (not *B. rosa-del-monte* Berg) of St. Vincent, may be a distinct type restricted to the Lesser Antilles—unless it is one of the Venezuelan species under cultivation. The *Brownea rosa-del-monte* of Fawcett's Guide to Castleton Gardens, Jamaica, is *Brownea ariza* Benth. and it is not unlikely that this is also the plant referred to by Taubert, when he gives Jamaica as the origin of *B. coccinea*.

Only one species has, to my knowledge, been reported from British Guiana and none from the country farther east. As *Brownias* generally grow in the foothills and gorges of low mountains and seldom, if ever, in the proper coastal plain, and as the hinterland of the Guianas has been very little explored botanically, it is easy to understand how these plants can have hitherto escaped observation. The same applies to the hinterland of Brazil, where Martius discovered Bentham's *B. negrensis*. The area of this species seems to mark the southernmost limit of the genus, since *B. cauliflora* has been transferred to the new genus *Browneopsis*.

From Colombia two species, *B. ariza* and *B. macrophylla*, have been reported. The former corresponds to the type of the Multijugatae, already represented by the Venezuelan *B. grandiceps*. The latter has the peculiarity of giving forth its ponderous inflorescences from the old wood of the trunk and larger limbs. It is also found in the woods of southeastern Panama.

#### THE GENUS BROWNEOPSIS.

In 1905 the lamented Dr. J. Huber established this genus with *B. ucayalina* as type.<sup>1</sup> The characters which differentiate it from *Brownea* are, according to the author, the absence of the sheath (formed, as we shall see, by 2 connate bracteoles), and the rudimentary petals. In Panama I found an apparently undescribed species, in which also the sheath is lacking, but in which the petals are well developed, although of much smaller size than in the species of *Brownea*. If the rudimentary condition of the petals were an essential character, the standing of *Browneopsis* would perhaps be somewhat shaken by this discovery of a transitional form, differing from *Brownea* only by the absence of the connate bracteoles. But there is another feature, in my mind of much greater importance, which seems to have escaped the attention of Dr. Huber. I refer to the number of stamens. It seems certain, namely, that in all true species of *Brownea* these number only 10 or 11, while in *Browneopsis ucayalina* they are 12 to 15, in *B. cauliflora* 15 or more, and in *B. excelsa*, the new Panamanian species, either 14 or 15. It is not unlikely that further investigations of the flowers of the 3 species will show the normal number of stamens to be 15. Thus the differential characters of *Browneopsis* are really the absence of sheath and the larger number of stamens, together with the lesser development of the petals.

The known species of *Browneopsis* are trees of small or middle size. The species found in Panama differ at first inspection from the Amazonian ones in having the inflorescences mostly terminal.

#### AFFINITIES OF BROWNEA AND BROWNEOPSIS.

The genera *Brownea* and *Browneopsis* form with *Macrolobium*, *Palovea*, *Heterostemon*, *Goniorrhachis*, and *Elizabetha*, a group of the *Caesalpinaceae*, tribe *Amherstieae*, characterized by the large bracteal envelopes of the inflorescence, which do not fall until after the opening of the flowers is well started, and by certain other structural characters. On account of the absence of bracteoles, *Browneopsis* would stand near *Tachigalia*, but the form of the receptacle and its adherence to the pistillary stipe, the number of the calyx divisions,

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<sup>1</sup> Bol. Mus. Goeldi 4: 565. 1905.



the shape of the petals, etc., make it unequivocally a member of the Brownea group, the only other deviation being in the number of stamens.

The generic distribution of this group can hardly be considered as settled, because of the fact that the species are very scantily represented in most herbaria. Much importance seems to have been attached, for instance, to the greater or lesser development of the petals, which is the only character separating *Heterostemon* from *Elizabetha*. I should not be surprised if a further study of these two genera would lead to their fusion and even *Palovea*, differing from the two former mainly by the free stamens, has, in my opinion, only a doubtful standing. These three genera constitute by themselves a group, while *Macrolobium*, with the upper petal abnormally developed, forms another, transitional toward *Eperua*, and *Brownea* a third, remarkable for its structural uniformity through a large number of specific forms. Through the cauliflorous *B. macrophylla* it leads again into *Browneopsis*, while *Browneopsis excelsa* establishes another link between this genus and the *Brownneas* with terminal inflorescences.

The following descriptions in these two genera are only of species represented in the U. S. National Herbarium:

#### PANAMANIAN AND VENEZUELAN SPECIES OF BROWNEA.

##### KEY TO THE SPECIES.

Leaves 5 to 15-jugate. (MULTIJUGATAE.)

- Rachis of leaves densely brownish-hairy; seeds flattened;  
 young shoots 4-sulcate..... 1. *B. grandiceps*.  
 Rachis of leaves glabrescent; seeds quite thick; young  
 shoots terete..... 2. *B. ariza*.

Leaves 2 to 6-jugate. (PAUCIJUGATAE.)

- Pods narrow (not over 1.5 cm. broad); leaflets short and  
 broad..... 3. *B. guaraba*.

Pods broad (3 cm. or more).

- Floral sheath about equal to the receptacle tube; clusters  
 few-flowered..... 4. *B. aroensis*.

Floral sheath distinctly longer than the receptacle  
 tube.

Leaflets eglandulose.

- Pedicels 7 to 8 mm. long, thick..... 5. *B. coccinea*.

- Pedicels 9 to 15 mm. long, slender; floral  
 clusters single, few-flowered..... 6. *B. speciosa*.

Leaflets with a basal gland.

- Floral clusters on stem only; leaflets 3 to 6 pairs. 7. *B. macrophylla*.

Floral clusters axillary or terminal.

- Leaves mostly 2-jugate; terminal leaflets  
 up to 40 cm. long..... 8. *B. rosa-del-monte*.

- Leaves mostly 3-jugate; terminal leaflets  
 about 16 cm. long..... 9. *B. latifolia*.

1. *Brownea grandiceps* Jacq. Coll. Bot. 3: 287. 1789.

A tree varying in stature from 3<sup>1</sup> to 20 meters,<sup>2</sup> the trunk erect and branching from the base. Bark brownish, shaggy; cross section of the whitish wood showing distinctly a cross formed by the medullary rays. Young shoots 4-sulcate and densely ferruginous-hairy.

Leaves 5 to 15-jugate; rachis 10 to 45 cm. long, terete, subsulcate, brownish-tomentose; petioles 2 to 10 mm. long. Leaflets opposite or subopposite, eglandulose; petioles 2 to 3 mm. long, stout, terete, densely brownish-tomentose; blades ovate, elliptic, or obovate-lanceolate, long cuspidate acuminate, oblique and rounded or subemarginate at the base with the broader lobe inside, the basal ones 5 to 10 cm. long, 2.5 to 3 cm. broad, the others 12 to 15 cm. long, 3.5 to 4.5 cm. broad. Nervation impressed above, prominent beneath, the costa hairy, the primary veins doubly anastomosed along the undulate margin. Leaf buds drooping, wrapped in 3 to 5 stipules, these obovate-acuminate, 15 to 40 cm. long, about 5 cm. broad, pink, pubescent outside.<sup>3</sup>

Floral spikes terminal, solitary, sessile, forming ovate heads often of considerable size, but usually from 10 to 15 cm. in diameter. Bracts numerous, obovate-attenuate, caducous, whitish brown hairy without, pubescent within, the exterior ones 5 to 10 cm. long, 2 to 3 cm. broad, subacute, the interior ones smaller. Floral pedicels 9 to 10 mm. long, densely covered with pale brown hairs. Sheath 2.5 to 2.7 cm. long, subcampanulate, the lobes obtuse and distinctly 1-costate, densely pale brown hairy without, glabrous within. Receptacle tube 1.7 cm. long, widening from base to tip, glabrous or glabrescent without, hairy within. Sepals 4, glabrous, 2.2 to 2.5 cm. long, rounded at tip, the anterior one 15 mm. broad and slightly emarginate, the others 9 to 12 mm. broad. Petals broadly obovate-spatulate, 4.4 cm. long, 2 cm. broad, attenuate at the base into a claw 1.5 cm. long, often subemarginate at the tip, pale pink or red, glabrous. Stamens 11, 4.2 to 4.8 cm. long, connate at the base into a tube 8 mm. long, densely hairy inside; filaments glabrous, subulate; anthers about 5 mm. long, 2 mm. broad. Pistil about 5 cm. long (stipe 1.5 cm., ovary 1.2 cm., style 2.3 cm.); stipe and ovary densely whitish-tomentose; style glabrous.

Pod flattened, broad,<sup>4</sup> with few flattened seeds.<sup>1</sup>

VENEZUELA: "Circa Caracas, in sylvaticis montanis," *Jacquin* (type). Near Cumana, Curiepe, Caracas, and La Victoria, flowers, December, *Humboldt & Bonpland*; Siquire Valley, State of Miranda, in woods, altitude 450 to 600 meters, flowers, March 20, 1913, *Pittier* 5969.

This is a well-defined type, characterized by its abundant, mostly tomentose and brownish indument, its many-jugate leaves forming at first showy purple bunches at the ends of the branchlets, and its large inflorescences, each of which contains, according to *Bonpland*, from 400 to 500 flowers. The tree is highly ornamental and worth the attention of the landscape gardeners interested in tropical projects. Its area seems to be limited to the hills of the "tierra caliente" of the lower belt of Venezuela, where it is known as "palo de cruz" or "rosa de montaña."

2. *Brownea ariza* Benth. Pl. Hartw. 171. 1857.

PLATES 59—62.

A tree 5 to 8 meters high, with a rounded-depressed crown. Young branchlets ferruginous-hairy.

Leaves paripinnate, with 6 to 10 pairs (or seldom more or fewer) of subcoriaceous leaflets, all opposite or subopposite. Rachis up to 40 cm. long, terete or obscurely

<sup>1</sup> Jacq. loc. cit.

<sup>2</sup> H. B. K. Nov. Gen. & Sp. 6: 313. 1823.

<sup>3</sup> When fresh from the bud, the leaves are lax and drooping and show a thick rachis, densely covered with shaggy whitish brown hairs, the leaflets narrowly lacinate, exstipulate, long-apiculate, of a beautiful purple color, the midrib marked by a thick line of snow-white hairs.

<sup>4</sup> *Pittier* in notes.



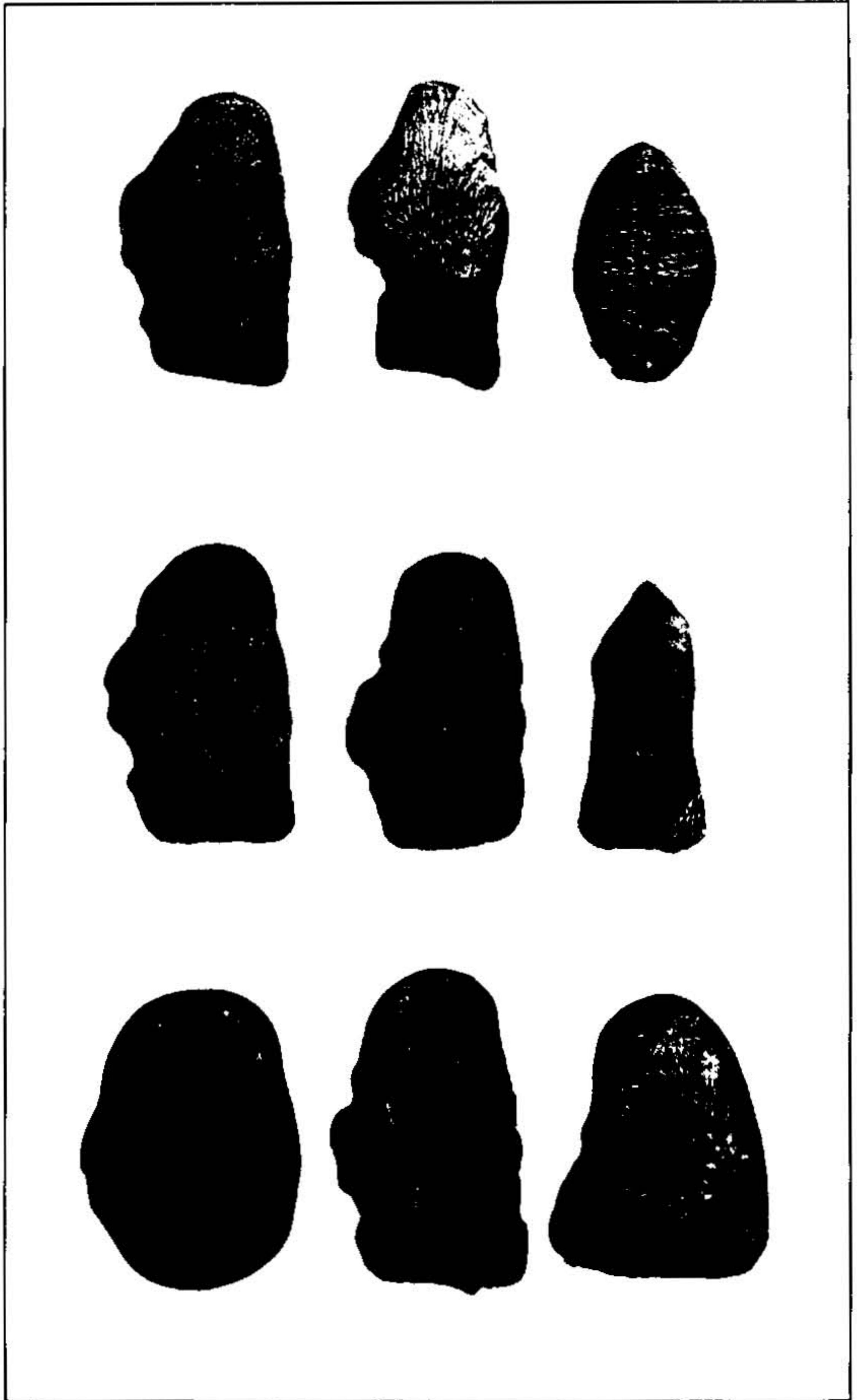
BROWNEA ARIZA BENTH.



BROWNEA ARIZA BENTH.



BROWNEA ARIZA BENTH.



SEEDS OF BROWNEA ARIZA BENTH.

striate, pubescent in young leaves, more or less smooth, verruculose and reddish later; petiole short (1 to 1.5 cm.), hairy or glabrescent. Petiolules 6 mm. long, pubescent or glabrous. Blades of the smaller basal leaflets ovate or ovate-elliptic, cordate, long-cuspidate, the smallest ones 3 cm. long and 1 cm. broad. Blades of the remaining leaflets elliptic, long-acuminate, rounded, oblique, and more or less emarginate at the base, 8 to 16 cm. long, 2 to 5 cm. broad, the broader half on the inside. Stipules linear, narrow, acuminate, caducous; stipels linear, 1 cm. long, caducous.

Inflorescence axillary or terminal, densely flowered, the rachis of the spike more or less hairy. Bracts pinkish, whitish-tomentose outside, broadly ovate and about 4 cm. long at the base of the spikes, narrowing at the tip to a narrow spatulate or linear appendage. Flowers scarlet pink, in the axils of the bracts. Pedicels rather slender, hairy, 7 to 8 mm. long. Sheath 2.5 cm. long, tubular and slightly wider at tip, finely pubescent outside, unequally cleft and bilabiate at tip, the lobes subacute. Receptacle tube 1.7 cm. long, slightly obconical, subangulose, glabrous outside, hairy inside. Sepals 4, 1.8 cm. long, free, the anterior one broad (about 15 mm.) and subemarginate at the rounded tip, the others narrow (8 mm.), elliptic, and emarginate at tip. Petals 3.4 to 3.5 cm. long, 1.2 to 1.3 cm. broad, obovate-spatulate, the lateral ones narrower, more or less oblique and irregular, the claw long and slender. Stamens 11, free or slightly connate at the base, 3.5 to 4 cm. long, slightly arcuate, the connate part of the filaments hairy inside, the anthers ovate, elliptic, 3.5 mm. long. Pistil a little over 6 cm. long from base of receptacle, the ovary densely pilose-pubescent, the style glabrous or very sparsely hairy and ending in a very small capitellate stigma.

Legume 15 to 18 cm. long, 4.5 to 5 cm. broad, single or 2 to each flower head, borne on a pedicel 2.5 cm. long, often surrounded by the persistent bractlets; short-stipitate (stipe about 7 mm. long), compressed, sulcate on the dorsal suture, bisulcate on the ventral one, 4-seeded, apiculate, yellowish or brownish hirsute-tomentose on the surface, expelling the seeds by the curling of the valves. Seeds elliptic-ovate, depressed, 5 cm. long, 2.5 cm. broad, and 1.5 cm. thick, both faces rugose and irregularly striate, the umbilicus salient and the omphalodic band extending all around the margin.

COLOMBIA: In forests near Guaduas, Province of Bogotá, Colombia, at an altitude of about 450 meters (type). Santa Marta, *H. H. Smith* 931; Cali, Cauca, flowers, December 13, 1905, *Pittier* 613. (Both in U. S. Nat. Herb.)

PANAMA: Hospital grounds at Ancon, Canal Zone, cultivated, flowers and fruit, February 13, 1911, *Pittier* 2722 (U. S. Nat. Herb.).

There are some small discrepancies between Bentham's very brief description and mine, as well as differences between specimens of distinct origin. Thus, the sheath was found in every case to be less than twice the length of the receptacle tube and not thrice as long as indicated by the above author, and while the stamens are free to the base, as in the type, in the specimen from Santa Marta, they show a slight adherence in those from Cali and Ancon. On the whole, however, the evidence is such as to leave no doubt as to the identity of our plant with that collected by Hartweg.

The specimens from Cali and Ancon were collected from cultivated trees. *Brownea ariza* is indeed, as are several other species of the same genus, a beautiful ornament of tropical parks and gardens. The large tree at Ancon is about 5 meters high, with a depressed, spreading crown and drooping boughs. The dense foliage itself, with the new leaves brightly purple-colored and hanging in heavy bunches, never fails to attract the eye, and the crimson heads of the flowers are of a gorgeous beauty.

If, however, the number of 400 to 500 flowers in each spike, as given by Bonpland for *Brownea grandiceps*, is exact, *B. ariza* probably remains far behind. Thirty-five to 50 flowers on one head were found opened at one time on the tree at Ancon. Anthesis begins at the base of the spike and as the sterile flowers fall, others appear on the following whorls of bracts. The pods are usually terminal on the axis of the spike.

The specific name *ariza*, from the Spanish "arizá," applied also to *B. macrophylla*, is not, as might be supposed, an aboriginal word. There was, about 1772, a governor of the Province of Darien called Don Andrés de Arizá, and it is not unlikely that the flower was named after him.

EXPLANATION OF PLATES 59-62.—Pl. 59, young leaves and sheathing stipules, Hope Gardens, Jamaica. Pl. 60, inflorescence and leaves, Cauca, Colombia, Pittier 613. Pl. 61, inflorescence and legume, Hope Gardens, Jamaica. Pl. 62, seeds, Ancon, Panama, Pittier 2722. All natural size. Plates 59 and 61 are from photographs by G. N. Collins.

### 3. *Brownea guaraba* Pittier, sp. nov.

A small tree. Branchlets slender, verruculose, 4-sulcate.

Leaves paripinnate, 2 to 4-jugate, entirely glabrous; rachis obscurely sulcate at base, 2.5 to 12 cm. long, greenish brown; petioles 6 to 8 mm. long; petiolules thick, terete, blackish, 5 to 7 mm. long; leaflets subopposite, broadly ovate, long-acuminate, 6.5 to 10 cm. long, 4 to 7 cm. broad, the basal pair smaller, distinctly cordate and almost orbicular, the others oblique, scarcely emarginate, 1-glandular at the base on the exterior side of the costa. Stipules not seen.

Inflorescence terminal, of few-flowered clusters. Bracts caducous, not seen. Peduncle short (1 cm.) and thick; pedicels about 1.1 cm. long, pubescent, thickening toward the tip. Sheath bilabiate, 2.5 cm. long, deeply cleft on one side, minutely pubescent, the lobes obtuse. Receptacle tube obconical, 1.8 cm. long, 6.7 mm. in diameter at tip, glabrescent. Calyx lobes 4, 2.5 cm. long, obtuse at tip, the anterior 1.2 cm. broad, the others about half narrower. Petals 5, obovate, attenuate into a long claw, 3.7 to 4 cm. long, 9 to 11 mm. broad, pink. Stamens 10 or 11, 3.8 to 4 cm. long, connate for more than half their length, minutely pubescent, often reduced to broad staminodes; anthers ovate. Pistil 6 cm. long, long-stipitate; ovary 8 to 10 mm. long, 10 to 12-ovulate, whitish pubescent; style glabrous; stigma capitellate, papillose, dark purple.

Pods stipitate, glabrous, 12 to 18 cm. long, 1.5 cm. broad. Seeds ovate, thin, narrowly winged, about 2 cm. long and 1 cm. broad, germinating in the pod.

Type in the U. S. National Herbarium, no. 602100, collected near Palmasola, State of Lara, Venezuela, near sea level in the forests around the Aroa River, flowers and fruits, June 27, 1913, by H. Pittier (no. 6366).

This species departs from all those hitherto described by two important characters, viz, the very short and broad leaflets, and the narrow, elongate pods. It grows in the dense woods of the coastal plain at the entrance of the Aroa valley, mixed with *B. aroensis*. The natives distinguish it from the latter, which they call "rosa macho," by the name of "rosa guaraba."

### 4. *Brownea aroensis* Pittier, sp. nov.

A forest tree up to 15 meters high, the trunk up to 40 cm. in diameter at the base.

Leaves 2 to 6-jugate; rachis 8 to 25 cm. long, slender, subangulate, glabrous or sparsely pubescent; petioles 6 to 20 mm. long; leaflets opposite, glabrous, very variable in size in different parts of the tree; petiolules 4 to 5 mm. long; leaflet blades elliptic, 5 to 11 cm. long, 2 to 4.5 cm. broad, oblique, the basal pair smaller, rounded (and ovate), or more or less emarginate at the base, the following leaflets (almost opposite) oblique, with the acute half on the outside, a glandule inserted on the side of the costa at the base. Stipules not seen.

Floral clusters single, pendent, few-flowered (10 flowers or less), growing from the stems or limbs or at the end of the branchlets. Peduncles rather slender, 1.5 cm. long, pubescent. Bracts few, caducous. Pedicels 1.5 cm. long, minutely pubescent. Sheath 2.8 cm. long, deeply cleft on one side, minutely pubescent without. Receptacular tube obconical, 2.5 cm. long, about 5 mm. in diameter at tip, minutely pubescent. Sepals 4, 2.7 cm. long, obtuse, glabrous, the anterior one 8 mm., the remaining ones 5 to 6 mm. broad. Petals 5, obovate, obtuse, 5 cm. long, 1.3 cm. broad, pink, attenuate into a claw 1.5 cm. long. Stamens 11, 4.7 to 5 cm. long, connate into a



tube 3.6 cm. long, this villous inside; anthers ovate, 3 mm. long, 1.5 mm. broad. Pistil 7.5 cm. long (stipe about 1.2 cm., ovary 8 to 9 mm., style 5.4 cm.), long-stipitate; ovary densely whitish-pubescent; style glabrous; stigma papillose.

Pod about 16 cm. long, 3 cm. broad, flat, reflexed-apiculate, the ventral suture acute or carinate, slightly winged. Seeds not known.

Type in the U. S. National Herbarium, nos. 602101-3. Collected near Palmasola, State of Lara, Venezuela, in forest along the Aroa River, near sea level. Flowers and fruits, June 27, 1913, by H. Pittier (no. 6367). Known also from Puerto de la Cruz, State of Aragua, flowers, April, 1914, *Jahn* 337.

The general description of *B. racemosa* Jacq. as given by De Candolle<sup>1</sup> would apply to this species, except as to the structure of the calyx, but when the detailed description of Kunth<sup>2</sup> is taken into consideration, the discrepancies become very evident and show that our plant is really quite distinct. Neither could it be *B. capitella*, because the definition "floribus dense capitatis" would hardly apply to its loose, few-flowered spikes. As there is no other possible name left, we shall have to consider the species new.

**5. *Brownea coccinea* Jacq. Stirp. Amer. 95. pl. 183. 1788.**

A small or middle-sized forest tree, with drooping boughs and rounded crown. Branchlets slender, terete, verruculose.

Leaves 1 to 4-jugate, entirely glabrous; rachis 6 to 16 cm. long, terete or obscurely striate; petiolules thick, blackish, 3 to 5 mm. long; leaflet blades ovate-elliptic, cuspidate, slightly oblique, eglandulose, 7 to 16 cm. long, 2 to 5 cm. broad. Stipules very caducous, not seen.

Inflorescences in many-flowered, rather loose clusters, growing either single from the trunk, limbs, and axils of the leaves, or in 2 or 3-clustered terminal racemes (each cluster with 10 flowers or more). Rachis of the racemes slender, glabrous; peduncles of clusters thick, about 1 cm. long, hairy. Bracts of the cluster about 10, ovate, pinkish, brownish-hairy outside, increasing in size from the basal one, about 2 mm. long and broad, to the interior one, nearly 3.5 cm. long and 3 cm. broad. Floral bracts obovate-spatulate, obtuse, long-stipitate, about 4 cm. long, pubescent, caducous. Pedicels 7 to 8 mm. long, thick, hairy. Sheath 3 cm. long, deeply cleft on one side, usually 2-lobed, sometimes 1-lobed, pubescent. Receptacle tube 1.6 cm. long, obconical, about 6 mm. wide at tip, glabrous outside, villous inside on margin. Sepals 4, 2.1 cm. long, obtuse, glabrous, the anterior one 1.2 cm. broad, the lateral and posterior ones 5 to 6 mm. broad. Petals 5, obovate, obtuse, 3.4 to 3.5 cm. long, 1 to 1.1 cm. broad, pink, attenuate at the base into a claw 1.2 cm. long. Stamens 11, 4 to 4.8 cm. long, connate, villous inside for half their length; anthers broadly ovate, 2.5 mm. long, 1.5 mm. wide. Pistil 6.8 cm. long, with the stipe as long as the receptacle tube; ovary 8 to 9 mm. long, pauciovulate (7 ovules or less), brownish-hairy; style about 3.5 cm. long, hairy only at the base; stigma minute, papillose.

Pods (immature) long-stipitate, sparsely ferruginous-hairy, 10 to 15 cm. long, the ventral suture flat, slightly winged, ridged along the median line, the stipe hairy, about 4 cm. long.

VENEZUELA: "In rupestribus sylvaticis Zaucac, sinus maritimi Venezuelae, ubi florentem Julio inveni," *Jacquin* (type). Guinand Estate, at the Quebrada de Cañaveral, Siquire Valley, State of Miranda, at about 600 meters, flowers and fruits, March 20, 1913, *Pittier* 5960 (U. S. Nat. Herb.).

My specimens agree quite well with both *Jacquin's* description and *Lamarck's* figure,<sup>3</sup> so that there is no doubt as to their really representing the type species of the

<sup>1</sup> Prodr. 2: 477. 1825.

<sup>2</sup> H. B. K. Nov. Gen. & Sp. 6: 312. 1823.

<sup>3</sup> Encycl. 3: pl. 575. f. 1. 1796?

genus. The Zauca Gulf or Bay does not figure on modern maps of Venezuela, but it can be surmised from the type localities of the other Jacquinian species that it is an inlet of the Golfo Triste, in the vicinity of Curiepe and Higuerote—that is to say, a locality in the same district where my no. 5960 was collected.

The vernacular name of *B. coccinea* is also "rosa," "roso," "macho." The tree grows in rocky, shaded gorges and does not seem to be very common.

**6. *Brownea speciosa* Reichenb.; DC. Prodr. 2: 477. 1825; Griseb. Fl. Brit. W. Ind. 212. 1864.**

A small tree, 6 to 8 meters high. Bark dark gray, verrucose on the younger branchlets.

Leaves paripinnate, 1 to 3-jugate, 4 to 6-foliolate, entirely glabrous; leaflets coriaceous; rachis terete, blackish, more or less verruculose, 4 to 7 cm. long; petiolules thick, 5 mm. long; leaflet blades ovate to obovate, eglandulose, rounded or submarginate at the base, rounded and abruptly acuminate at tip, 7.5 to 16 cm. long, 4 to 7 cm. broad, the basal pair always smaller. Stipules caducous, not seen.

Flowers in fascicles of 6 to 8 at the ends of the branchlets. Bracts caducous, not seen. Peduncles often geminate, thick, about 1.5 cm. long, glabrescent; pedicels 9 to 15 mm. long, slender, pubescent. Sheath funnel-shaped, minutely pubescent, 2.5 cm. long, divided into two lobes, one of the sinuses deeper than the other; lobes about 7 mm. long, ovate, acute. Receptacle tube 1.4 to 1.5 cm. long, stiff, broadened at the tip (5 mm. wide) pubescent; calyx lobes 4, glabrous, the anterior one ovate-oblong, often submarginate, 2.5 cm. long, 1.2 cm. broad, the remaining ones narrowly elliptic, 2.5 cm. long, 7 mm. broad, all obtuse at tip. Petals 5, obovate, attenuate into a narrow claw 3.5 to 3.7 cm. long, 1.3 to 1.7 cm. broad, rounded or obscurely emarginate at tip, glabrous, pink. Stamens 10 or 11, unequal, 5.2 to 5.6 cm. long, all united from the base into a tube 3.5 cm. long and free only for the upper 2 cm. or so; anthers ovate, about 3.5 mm. long and 2.2 mm. broad. Pistil 6.8 cm. long, long-stipitate; ovary 7 to 8 mm. long, 7-ovulate, densely whitish-pubescent; style 4.7 cm. long, slender, glabrous; stigma capitellate, papillose, dark purple.

Fruit not collected.<sup>1</sup>

VENEZUELA: Valley of Río Limón, on the new road from Maracay to Ocumare de la Costa, Aragua, altitude about 700 meters, flowers, April 18, 1913, *Pittier* 6054 (U. S. Nat. Herb.).

**7. *Brownea macrophylla* Linden, Cat. no. 18. 11. 1863; Gard. Chron. 1873: 777. f. 149. 1873.**

A tree 6 to 12 meters high, the trunk 20 to 35 cm. in diameter, with sparse ramification. Young twigs villous.

Leaves paripinnate, large, with 3 to 6 pairs of leaflets; rachis 20 to 40 cm. long, subsulcate toward the base, more or less terete, unevenly villous-pubescent; petiole 1 to 1.5 cm. long, thick, terete. Lower and terminal pairs of leaflets opposite, the intermediate ones more or less alternate-distichous; petiolules 5 to 6 mm. long, rather thick, densely pilose-pubescent; leaflet blades elliptic-lanceolate, rounded or subcuneate and glandular at the base, ending with a long, acute acumen, the first pair, close to the insertion of the petiole, about 10 cm. long and 2 cm. broad, the terminal pair largest, 32 cm. long and 7.5 cm. broad; costa prominent beneath the blade and villous, the rest of the leaflet glabrescent and eglandulose.

Flowers 30 to 50 together in large capitate spikes, growing profusely on the surface of the trunk, from base to top, and sometimes on the larger limbs. Bracts large, broadly ovate and from 2 to 5 cm. long, at base of spike, obovate-elliptic, about 6 cm. long and narrowing to 2 mm. near end of the same, all pinkish white, more or less pubescent outside and sparsely so inside. Flowers fire-red, in the axils of the bracts;

<sup>1</sup> If I remember correctly, it is broad and flat, as in *B. coccinea*.

pedicels about 4 mm. long. Sheath 3.5 to 4 cm. long, subcampanulate, densely grayish-tomentose outside, smooth inside, bilabiate at tip, the lobes rounded, about 1.2 cm. long, the anterior one slightly broader than the posterior. Receptacular tube about 1.7 cm. long, cylindrical but somewhat broadened at tip; divisions of calyx 4, more or less connate at the base, obovate-elliptic, glabrous, all 3 cm. long, but the anterior one rounded and emarginate at the tip, 1.3 cm. broad, the 3 remaining ones subacute and only 5 to 7 mm. broad. Petals 5 cm. long, spatulate, attenuate at the base into a long slender claw, rounded and obtusely subulate at tip, one of them almost symmetrical and 1 cm. broad, the 4 remaining ones oblique and narrower. Stamens 11, connate for about 2 cm. at the base, 10 to 11 cm. long; filaments attenuate and subulate at the tip; anthers ovate, about 4 mm. long. Pistil 12 to 12.5 cm. long; ovary long-stipitate (stipe about 2.2 cm.), densely tomentose, with about 12 ovules; style (about 8.5 cm. long) filiform, arcuate, attenuate, sparsely pubescent at the base, glabrous at tip; stigma capitellate, spherical.

Legume not known.

COLOMBIA: Antioquia, *Linden* (type).

PANAMA: Forests around Boca de Pauarandó, Sambú Valley, southern Darien, flowers, February 5, 1912, *Pittier* 5591 (U. S. Nat. Herb.); forests around Pinogana, southern Darien, flowers, April 22, 1914, *Pittier* 6571; slopes of Cerro Pirre, southern Darien, leaves only, June, 1914, *Pittier* 6973.

The name *Brownea macrophylla* appears for the first time in 1863, in a garden catalogue, and the nearest approach to a description is an incomplete account by Masters, accompanying a poor figure, in the *Gardener's Chronicle* for 1873.<sup>1</sup> The illustration represents a dwarfed specimen growing in the greenhouses of W. H. Crawford, Esq., at Lakeville, near Cork, Ireland. The circumstance that Linden's plant is said to be a native of Antioquia, a State of Colombia, close to Darien, in Panama, where our specimens were collected, and certain peculiarities reported in the cited account, lead to the conclusion that the tree seen by me in all its tropical exuberance and splendor is the same as the one growing in European greenhouses under the above name.

With *B. cauliflora* Poepp. & Endl., *B. macrophylla* Linden forms a peculiar section of the genus, characterized by having the inflorescences always growing from the old wood of the trunk and larger limbs. The former species is a native of the Amazonian Peru and differs from the latter by the reduced number of leaflets, the larger number of stamens (15 to 20?), and the reduced proportions of its flowers.

At blooming time, *Brownea macrophylla* is one of the most striking features of the foothill belt in the Sambú Valley. In the semidarkness of the dense tropical forest, its erect stems, entirely covered by the red blossoms, and showing for an instant between the trunks of the larger trees, strike the eye of the traveller almost as would lightning. Among the natives it is called "arizá," a name which applies also to another species growing in Colombia.

In every investigated case, the trunk of *Brownea macrophylla* was found to be hollow and inhabited by a medium-sized black ant. The blossoms also were almost invariably worm-eaten and full of grubs.

#### 8. *Brownea rosa-del-monte* Berg, Phil. Trans. London 63: 174. pl. 8, 9. 1773.<sup>2</sup>

A tree 3 to 10 meters high, the trunk up to 25 cm. thick at the base. Bark grayish, rugose on main stem, more or less smooth and verruculose on the limbs.

Leaves entirely glabrous, with 1 to 3 pairs of opposite leaflets, the terminal ones much larger. Rachis 7 to 15 cm. long, thick, the short (about 1 cm. long) petiolar part thicker and dark-colored, the petiolules also thick, 5 mm. long. Blades of the basal

<sup>1</sup> Pages 777, 779.

<sup>2</sup> The bibliographic reference for this species is wrong in De Candolle's *Prodromus*, the *Index Kewensis*, and several other publications.

leaflets ovate, rounded or subcordate at the base, acutely long-cuspidate, 12 to 18 cm. long, 4 to 7 cm. broad. Blades of the terminal leaflets up to 40 cm. long and 11 cm. broad, elliptic, cuneate-rounded or more or less rounded at base, long-cuspidate. Costa and lateral veins prominent beneath, the latter arcuate and twice anastomosed along the margin. Minor venation finely reticulate.

Inflorescence terminal, almost sessile on branchlets often defoliated at blooming time; flowers pink. Bracts pubescent outside, broadly ovate and clasping at the base of the flower head, narrowing toward the top into a linear appendage 5 cm. long, all pale pink. Pedicels 5 mm. long, hairy. Sheath tubular-campanulate, bilabiate, nearly 4 cm. long, hairy-tomentose outside, the lobes not over 5 mm. long. Receptacular tube cylindrical, slightly obconic, 2 cm. long. Divisions of the calyx 5, more or less connate at the base, elliptic, rounded or subacute at the tip, 2.5 cm. long. Petals 5, 4 to 6.5 cm. long, the median one spatulate, about 6 mm. broad, the lateral ones oblique, narrower, often irregular or subauriculate. Stamens 11, about 9 cm. long, monadelphous. Pistil 12 cm. long from top of receptacle; ovary hairy-tomentose; style slender and glabrous except at the base; stigma capitellate.

Legume 12 to 14 cm. long, 4 cm. broad, short-stipitate, compressed, winged on the ventral side with the suture salient in the form of a sharp ridge, narrowly furrowed along the dorsal side, 3 or 4-seeded, ending in a short, thick apex, pale brown pubescent, dehiscent. Mature seeds not seen.

PANAMA: In montosis Tierra Firme, Porto Bello, *Pohl* (type). Wooded hills of Sperdi near Puerto Obaldía, San Blas Coast; a single tree, in blossom, the inflorescence half worm-eaten, September 8, 1911, *Pittier* 4408. In forests around Porto Bello, flowers and fruits, March 22, 1914, *N. F. Petersen* (*Pittier* 6522). (Two latter in U. S. Nat. Herb.)

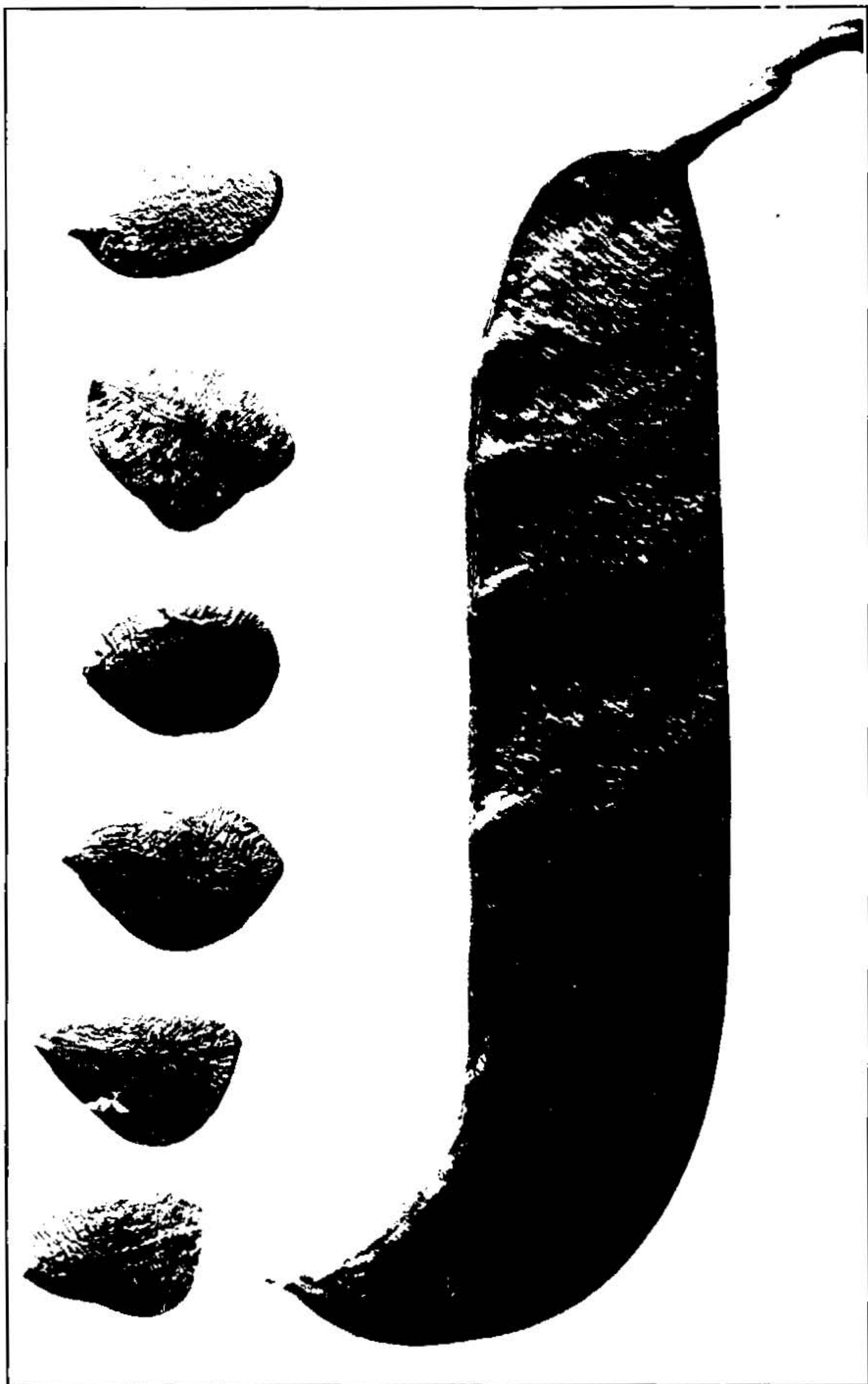
The type of this species was collected, as were our own specimens, in the Regenwälder of the Atlantic watershed of Panama. De Candolle gives as its synonym the *Hermesias* of Loeffling, and Grisebach tries to identify it with a *Brownea coccinea* Loeffl., to which no other reference is found. Both authors have evidently erred. Berg's description applies quite satisfactorily to the Sperdi plant and this is altogether distinct from any known Venezuelan species. It is perhaps more closely related to *B. negrensis* Benth., but differs by the unusual size of the terminal leaflets, the relative proportions of the flower parts, and the sepals apparently all free, a case unique in the genus.

The specific name *rosa-del-monte* cannot be declined and so is hardly tenable. Some authors have remedied it by simply suppressing the two last words, calling the species *Brownea rosa*. It must be remembered, however, that *rosa* is the generic vernacular name for *Brownea* and that in Panama the name *rosa del monte* is specific for Berg's plant. It is suggested that using *Brownea rosa-montis*, i. e., the direct translation of *rosa-del-monte*, would be the way to set right the defective name originally used.

**9. *Brownea latifolia* Jacq. Fragm. Bot. Illustr. 25. pl. 17. 1809.**

Leaves 3-jugate, glabrous; rachis 10 cm. long; petiole 1 cm. long; petiolules 5 mm. long, thick; basal leaflet blades ovate-elliptic, long-acuminate, scarcely oblique, 10 cm. long, 4 cm. broad; terminal leaflets obovate-elliptic, quite oblique, the acute half inside, 16 cm. long, 6 cm. broad; all the leaflets with a gland on the inside at the base of the costa.

Inflorescence of 2 or 3-clustered, terminal racemes. Clusters many-flowered. Cluster bracts ovate, increasing in size from the base, sparsely pubescent outside; floral bracts linear, about 2.5 cm. long. Pedicels 5 mm. long, pubescent. Sheath 1.9 mm. long, cleft only a little deeper on one side than on the other, sparsely pubescent, the lobes often slightly emarginate at the tip. Receptacular tube 1.2 mm. long, 4 mm. wide at tip. Sepals 2.2 cm. long, glabrous, the anterior one 9 mm. broad, emarginate at tip, the others 3 mm. broad. Petals 3.8 cm. long, obovate, subemarginate at



POD AND SEEDS OF *BROWNEOPSIS EXCELSA* PITTIER.

tip, attenuate into a claw 1.5 cm. long. Stamens 10 to 12, 4 to 4.5 cm. long, connate, the tube hairy inside for the first 2 cm.; anthers ovate, about 3 mm. long and 1.5 mm. broad. Pistil 6 cm. long (stipe 1.3 cm., ovary 8 to 9 mm., style 3.7 cm.); ovary ferruginous-pubescent; style filiform, glabrous.

Type from Caracas, Venezuela.

Grown in greenhouse of U. S. Department of Agriculture (no. 1840).

#### A NEW SPECIES OF BROWNEOPSIS.

*Browneopsis excelsa* Pittier, sp. nov.

PLATE 63.

A large tree, 25 to 30 meters high, with spreading branches drooping at the extremities. Trunk up to about 45 cm. in diameter at the base; bark grayish and more or less smooth.

Leaves paripinnate, glabrous, pink-colored and drooping when young, with 2 or 3 pairs of nearly opposite leaflets. Common petiole 4 to 10 cm. long, slender, terete. Leaflets petiolulate; petiolules 6 mm. long, perfectly straight, terete, dark-colored; blades ovate, long-cuspidate, 3 to 10 cm. long, 1 to 4 cm. broad, subcoriaceous, glandular at the base; costa prominent beneath the leaflet, but venation hardly distinct. Stipules very small and caducous.

Inflorescence mostly terminal, with the flowers in 4 or 5 fascicles at the end of a thick peduncle and surrounded by numerous caducous imbricate bracts. Peduncle thick, 1.2 cm. long, showing the postbracteal scars. Bracts clasping, densely hairy-pubescent outside, the lower ones about 3 mm. long, ovate and subacute, the upper ones 23 to 35 mm. long, 3.5 mm. broad, obovate and more or less truncate at the top. Sheath absent. Receptacular tube thick, coriaceous, angulate, about 8 mm. long; divisions of the calyx 4, petaloid, pale pink, glabrous, 3 of them elliptic, 2.5 cm. long, 5 mm. broad, the fourth clasping the pistil, 1.5 mm. long, 7 mm. broad, almost acute at the tip and with two lateral, acicular, shorter lobules. Petals obovate-elongate, about 30 mm. long and 5 mm. broad, rounded at the tip and attenuate into a long slender claw, pale pink. Stamens 14 or 15, connate at the base, the median ones 35 mm. long, the lateral ones shorter; filaments smooth, arcuate; anthers nearly 10 mm. long, versatile. Pistil 6.4 cm. long from tip of receptacular tube; ovary stipitate, multiovulate, densely covered with a pale brownish gray pubescence; style smooth, slender, 4 cm. long; stigma capitellate.

Legume about 18 cm. long, 3.5 cm. broad, stipitate (stipe 3 cm. long), bivalvate and dehiscent, coriaceous, many-seeded, falcate and rostrate at the apex, covered with an evanescent cinnamon-brown indument; peduncle 2.5 to 3 cm. long. Seeds ovoid, flattened, 25 to 30 mm. long and 17 to 22 mm. broad.

Type in the U. S. National Herbarium, nos. 715759-61, collected in forest near Garachiné, southern Darien, Panama, flowers, January 28, fruit (immature), February 11, 1912, by H. Pittier (no. 5511).

Represented also by specimens collected in the vicinity of Marraganti, on the Zurya River, southern Darien, immature fruit, April, 1908, R. S. Williams 1011 (U. S. Nat. Herb.).

EXPLANATION OF PLATE 63.—Pod and seeds, from Pinogana, southern Darien, Pittier. Natural size.

### ANACARDIACEAE.

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

*Tapirira myriantha* Triana & Planch. Ann. Sci. Nat. Bot. V. 14: 295. 1872.

A large tree, 25 meters high or more, the trunk 80 cm. in diameter at the base; ramification ascending, irregular; crown rounded, depressed; bark of the trunk and limbs grayish, rimose, that of the younger twigs grayish brown, dotted with numerous lenticels.

Leaves alternate, imparipinnate, with 5 to 9 leaflets. Rachis 8 to 18 cm. long, minutely pubescent, the petiole about 6 cm. long, thicker and deeply canaliculate at the base. Leaflets petiolulate; petiolules pubescent, those of the lateral leaflets 7 to 10 mm. long, that of the terminal 15 to 18 mm.; leaf blades oblique, oblong or oblong-lanceolate, more or less acute or rounded and uneven at the base, acutely acuminate at tip, 9 to 22 cm. long, 4 to 6 cm. broad; margin entire; venation impressed above, prominent and sparsely pubescent beneath, the primary veins running straight to the margin and then arcuately anastomosed. Panicles axillary at the end of the branchlets, equal in length to the leaves or shorter, ramified and densely flowered. Rachis more or less ferruginous-pubescent. Flowers (only the male ones known) small, pedicellate, 1 to many-clustered. Pedicels not over 1 mm. long, hairy. Calyx hairy, about 0.7 mm. long, 5-lobulate, the lobules rounded-obtuse; petals 5, 1.5 to 1.7 mm. long by 0.5 to 0.7 mm. broad, more or less oblong-elliptic, acute or irregularly denticulate at tip, pale yellow, erect or spreading; stamens 10, the longest hardly exceeding the corolla; anthers orbicular, depressed, emarginate at base, bright yellow; rudimentary pistil obscurely 5-parted at tip.

COLOMBIA: Buenaventura, western coast, *Triana* (type).

PANAMA: Loma de la Gloria, near Fató, Province of Colón, flowers, August 4, 1911, *Pittier* 4101 (U. S. Nat. Herb.).

Differs from *T. guianensis* Aubl. by its larger, always acutely acuminate leaflets, its shorter and more compact panicles, and its smaller flowers. Our specimens differ from those described by Triana and Planchon in having from 5 to 9 leaflets instead of the constant number of 5.<sup>1</sup>

**Tapirira chagrensis** Pittier, sp. nov.

A tree about 20 meters high, the trunk 35 to 40 cm. in diameter at the base. Trunk straight, 8 to 10 meters from ground to first limbs. Ramification ascending, irregular; crown elongate, flattened at the top. Bark grayish and rimose on the trunk and larger limbs, light brown, obscurely sulcate, and lenticellose on the younger growth.

Leaves entirely glabrous, 9-foliolate; rachis 12 to 25 cm. long, the petiole 6 to 10 cm., broadly flattened above with expanded base, finely striate longitudinally. Leaflets opposite, petiolulate; petiolules shallowly sulcate with a middle ridge in the furrow, those of the lateral leaflets 1 to 1.5 cm., the terminal one about 3 cm. long. Leaflets coriaceous, oblique, ovate or obovate to elliptic, unequally cuneate at the base, narrowed at the tip into a narrow rounded acumen, 8 to 17 cm. long, 3 to 6.5 cm. broad; margin entire; venation subimpressed and finely reticulate above, prominent beneath, the primary veins profusely connected by transverse veinlets and arcuately anastomosed at their ends.

Panicles axillary to the uppermost leaves, short (12 to 15 cm. long), branching only once, rather few-flowered, more or less pilose-pubescent. Male flowers sessile; calyx about 1.5 mm. long, sparsely hairy outside, the 5 lobules acute or subacute at tip, the corolla white, the petals 5, naviculiform, erect, about 2.8 mm. long and 1 mm. broad, pointed at the tip. Stamens 10, included or slightly exerted; anthers small, yellow. Rudimentary pistil rounded, stiffly hairy. Female flowers and fruit unknown.

Type in the U. S. National Herbarium, no. 678552, collected in forest along the Chagres River above Alhajuela, Province of Panama, Panama, May 13, 1911, male flowers only, by H. Pittier (no. 3503).

This species belongs evidently to *Eutapirira*, but differs obviously from those hitherto described by the absolute smoothness of its leaves, the peculiar appearance of the petioles, and the special disposition of the flowers, which are quite sessile and mostly single along the rachis.

<sup>1</sup> In Mart. Fl. Bras. 12<sup>2</sup>: 377, Engler curiously attributes to the species of his section *Eutapirira irregularly serrate leaflets*. We have seen the four species described by him as belonging to this section and in all the leaflets have a plainly entire margin, more or less revolute in dry specimens.

## HIPPOCRATEACEAE.

## A NEW SPECIES OF SALACIA.

*Salacia blepharodes* Pittier, sp. nov.

FIGURE 88.

A small tree 3 to 4 meters high, with flat, spreading crown. Bark gray, almost smooth. Branchlets divaricate, nodose.

Leaves alternate or subopposite, clustered at the ends of the year's growth, coriaceous, smooth, short-petiolate; petioles 2 to 3 mm. long. Leaf blades ovate-lanceolate to obovate, attenuate at base, rounded or acute at tip, 4 to 6 cm. long, 1.5 to 2.5 cm. broad; margin serrate, revolute.

Inflorescence axillary or on leafless nodes, sessile or almost so, one red flower growing at a time out of a budlike cluster of small brown bracts. Pedicel white, smooth, slender, about 15 mm. long, sheathed at the base in a short bractlet, this brown and fringed on the margin. Calyx, corolla, and disc connate at the base. Sepals ovate and irregular, fringed at the tip, 2 to 2.5 mm. long, 2 mm. broad. Petals irregularly ovate and denticulate, contiguous on their broadest part, narrower and slightly distant at the base, between 2.5 and 3 mm. long and broad. Disc flat, about 2.5 mm. wide. Stamens 5, yellow, inserted on the margin of the disc; filament short (0.8 to 1.2 mm. long), flattened; anthers extrorse, broadly rounded, splitting longitudinally. Ovary 3-celled; style none; stigma obscurely 3-lobulate.

Fruit and seeds unknown.

Type in the U. S. National Herbarium, no. 677476, collected on the outskirts of the forest around El Potrero, Chiriquí Volcano, Panama, at an altitude of 2,800 to 3,000 meters, flowers, March 12, 1911, by H. Pittier (no. 3086).

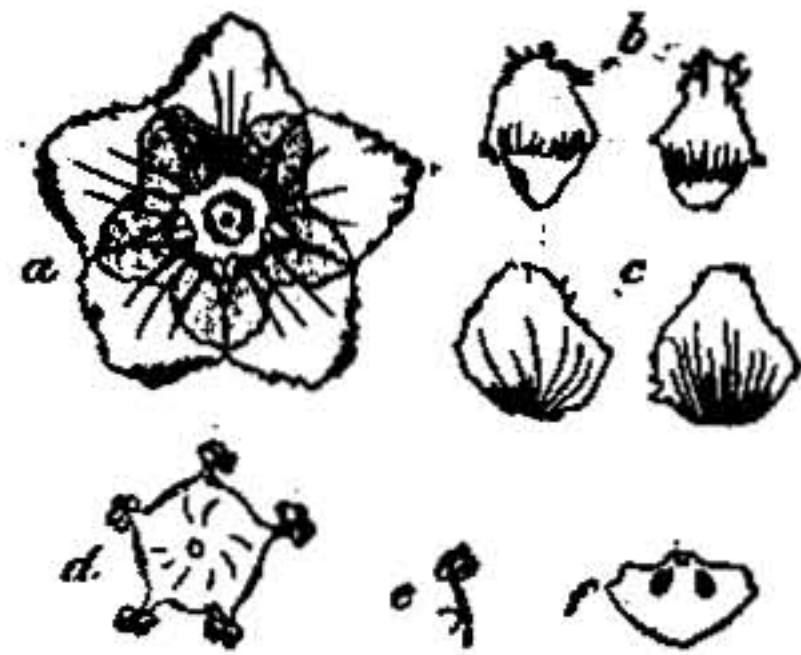


FIG. 88. — *Salacia blepharodes*. a, Flower seen from above; b, sepals; c, petals; d, disc and stamens, flattened and out of shape; e, stamen; f, longitudinal section of ovary. Scale 3.

## BOMBACACEAE.

## BOMBACOPSIS, A NEW CENTRAL AMERICAN GENUS BETWEEN BOMBAX AND PACHIRA.

Although the late K. Schumann, in the *Pflanzenfamilien*<sup>1</sup> included in a single genus the species of *Bombax* L. and *Pachira* Aubl., the majority of botanists have continued to keep them apart. Notwithstanding the close affinities between the two groups, their separation seems to be fully justified. In the structure of the flower there are clear differences of detail while the differences in the fruit and seeds are fundamental.

## CHARACTERS OF BOMBAX.

The staminal tube of *Bombax* is short and thick, and, in *B. barbigon*, for instance, is divided first into 5 short fascicles, each of which in turn splits into 2 smaller bunches, containing about 140 stamens each, the filaments of which are free. The petals of *Bombax* are elliptic-lanceolate or ovate and slightly adherent to the staminal



tube, falling with it; in prefloration they are twisted and in the later periods of anthesis both become reflexed and twisted corkscrew-like. The cuplike calyx is almost always short and broad. The capsule is fusiform and filled with a thick wool derived from the endocarp, in which are imbedded numerous seeds, like peas in shape, size, and color. The floral bud is ovoid and relatively short and the whole flower is also thickset with a more or less spherical outline. The flower and fruit structures characteristic of this genus are shown in the accompanying illustrations of *B. barrigon* (pls. 64-67).

#### CHARACTERS OF PACHIRA.

In *Pachira* the flower is long and slender and the calyx subtubulose; the long petals are laciniate to spatulate and are simply reflexed during the anthesis; the staminal tube is 4 to 6 times as long as in *Bombax* and is more or less distinctly 5-branched. The arrangement of the stamens seems to differ according to the species, the further division of the fascicles being for instance nearly dichotomous in *Pachira macrocarpa* and regularly ramified, with a pectinate arrangement in *Pachira insignis*. The fruit, varying in shape from ovoid, as in *Pachira aquatica* to depressed-globose, as in *Pachira insignis*, is always more or less rounded at base and tip and often attains very large dimensions. The endocarp is silky-lined or somewhat hairy inside, but never woolly, and the seeds, irregularly rounded on account of being crowded together, are of about the size of a chestnut. *Pachira macrocarpa* is illustrated in plates 68 and 69; *P. aquatica* in plates 70 and 71; *P. insignis* in plates 72 and 73.

#### THE DIFFERENCES SUFFICIENT FOR DISTINCTION.

There are other characters which may help in distinguishing these two genera, but the above, with the aid of the illustrations, are sufficient for our purpose. The general aspect of the flowers and the presence or absence of wool in the fruit are in fact sufficient to distinguish at first sight *Bombax* from *Pachira*. Besides this, as far as indicated by the Panamanian species, the former bloom when the tree is absolutely bare of leaves, while the flowers of the latter are often hidden among the thick foliage, which is always entirely developed at the time of anthesis.

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EXPLANATION OF PLATES 64-67.—Pl. 64, flower and floral buds, forest near Old Panama, Panama, *Pittier*. Pl. 65, calyx, style, and stamens of preceding specimen, with section of bud showing arrangement of stamens. Pl. 66, fruit and leaves, Hope Gardens, Jamaica. Pl. 67, fruit with pericarp removed, showing seed mass. Hospital Grounds, Ancon, Canal Zone, Panama, *Pittier*. All natural size. Pl. 66, from photograph by G. N. Collins.

EXPLANATION OF PLATES 68-73.—Pl. 68, androecium of *Pachira macrocarpa*, Nicoya, Costa Rica, *Pittier*. Pl. 69, section of capsule of same species, showing seeds, Chiapas, Mexico. Pl. 70, leaf and androecium of *P. aquatica*, Hope Gardens, Jamaica. Pl. 71, pod of same, Hope Gardens, Jamaica. Pl. 72, flower and fascicle of stamens, *P. insignis*, Caracas, Venezuela, *Pittier*. Pl. 73, fruit of same individual. Pls. 68 to 72 natural size; pl. 73, scale 2/3. Pls. 69 to 71 from photographs by G. N. Collins.



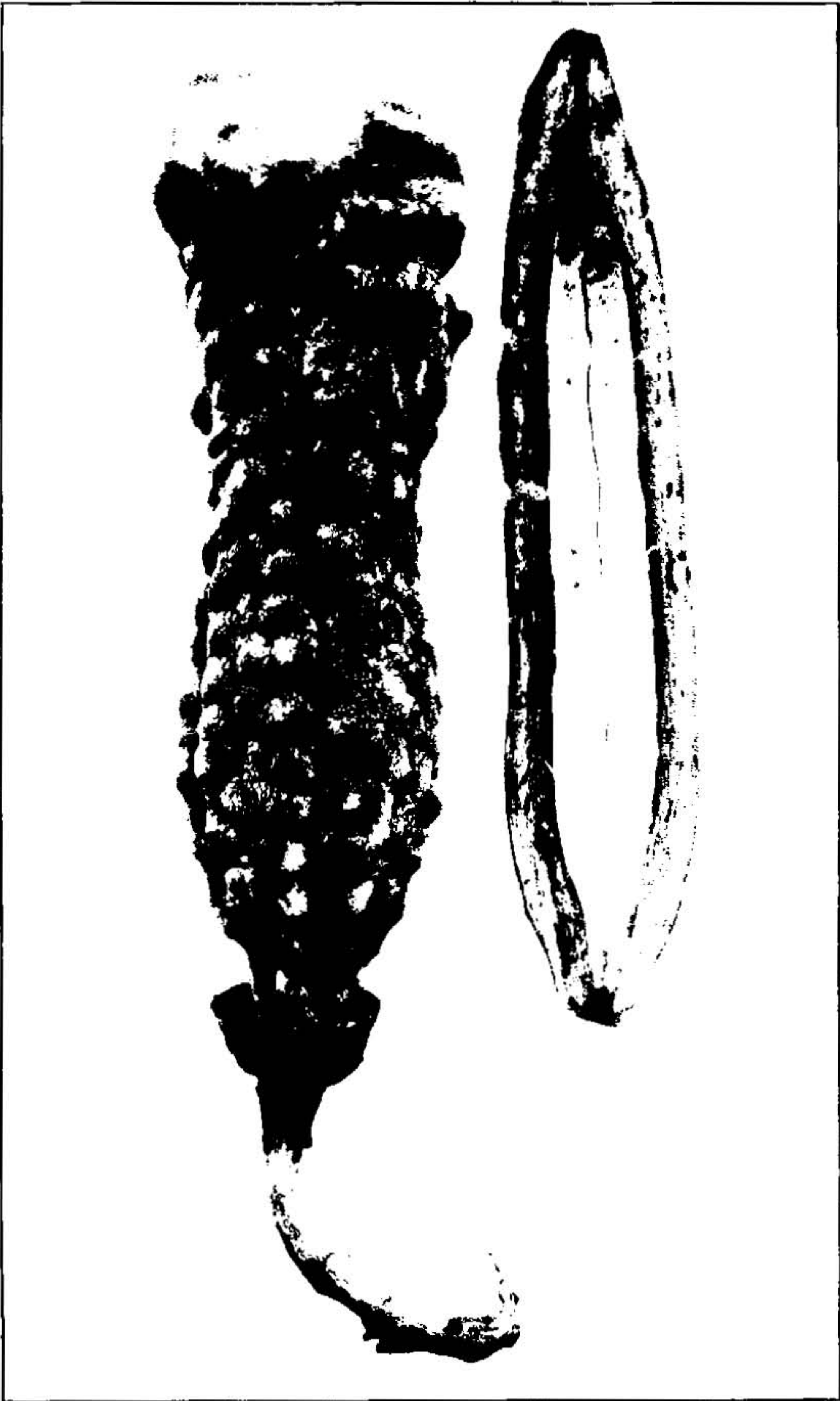
BOMBAX BARRIGON (SEEM.) DECAISNE.



BOMBAX BARRIGON (SEEM.) DECAISNE.



BOMBAX BARRIGON (SEEM.) DECAISNE.



BOMBAX BARRIGON (SEEM.) DECAISNE.



PACHIRA MACROCARPA WALP.

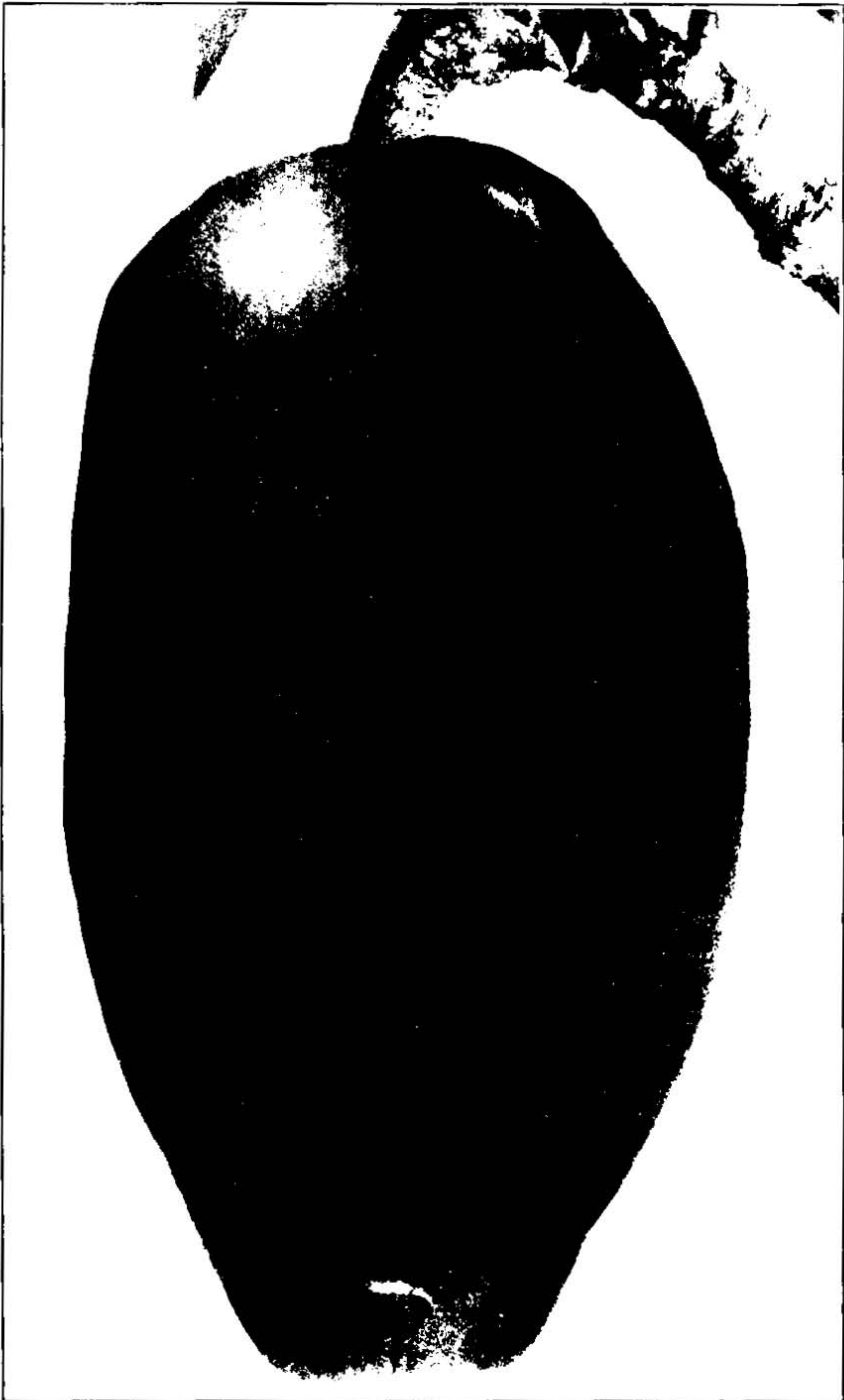


SEEDS OF PACHIRA MACROCARPA WALP.



PACHIRA AQUATICA AUBL





FRUIT OF PACHIRA AQUATICA AUBL.



FLOWER OF PACHIRA INSIGNIS SAV.



FRUIT OF PACHIRA INSIGNIS SAV.

## AN INTERMEDIATE GENUS REQUIRED.

Besides at least 1 species of *Bombax* (*B. barrigon* (Seem.) Decaisne) and 2 of *Pachira* (*P. aquatica* Aubl., *P. villosula* Pittier), there are in Panama 2 other species, considered by both Bentham and Seemann to belong to *Pachira*, but which, according to the generic definition, might just as well stand under *Bombax*. As the fruit of neither of them was known, their being placed in *Pachira* was justified on the ground of the general appearance of the flower. The transfer by Hemsley<sup>1</sup> of *Pachira fendleri* Seem. to *Bombax* was rather guesswork, and it is likely that the peculiarly shaped capsule of that tree would have puzzled to some extent the eminent botanist of the Kew Herbarium. The name of the closely related *Pachira sessilis* Benth. remained unchanged, but its fruit so much resembles that of a *Bombax* that this tree also might with some reason be listed in this genus.

As it is, these two species form a group almost exactly intermediate between *Pachira* and *Bombax*, the flower differing from that of the first only in minor details, and the fruit departing but in one point from the capsule which characterizes *Bombax*.

At first sight the flowers look like miniatures of those of *Pachira*. The calyx is tubular and narrow, the petals are long, lacinate, and inserted on a cufflike disc inclosing the base of the staminal tube. This is again much longer than in *Bombax* and it divides into 5 fascicles in which the staminal filaments are parted from the base.

In *Bombax sessile* (Benth.) Decaisne the fruit has the rounded exterior of that of *Pachira aquatica*, but its seeds are of the size and appearance of a small pea and surrounded by the woolly bed that characterizes *Bombax*. The capsule of *Pachira fendleri* Seem., on the other hand, is quite distinct, being small, with coriaceous instead of woody walls, a pentagonal section, and a truncate apex.

From the above it appears clearly that we have in Panama two *Bombacaceae* nearly related to *Pachira* and *Bombax*, but which can not be placed in either group. They should then form for themselves a new genus, for which the name "Bombacopsis" is proposed.

## KEY TO BOMBAX, PACHIRA, AND BOMBACOPSIS.

The following is a tentative key for the determination of the three genera:

- Seeds 1.5 cm. or more in diameter, imbedded in the fleshy dissepi-  
ments of the capsule; flowers large and elongated (up to 35 cm.  
long); staminal fascicles repeatedly branched..... PACHIRA.  
Seeds 6 mm. or less in diameter; flowers rather short (not above 15 cm.  
long); staminal fascicles dividing at once into single filaments..  
Flowers short and thick; stamens very numerous (about 1,400).. BOMBAX.  
Flowers slender; stamens about 75..... BOMBACOPSIS.

<sup>1</sup> Biol. Centr. Amer. Bot. 1:124. 1879.

## DESCRIPTION OF BOMBACOPSIS AND ITS SPECIES.

**Bombacopsis** Pittier, gen. nov.

Calyx tubular, obscurely 5-lobulate. Petals 5, laciniate, about 12 times as long as the calyx. Staminal tube divided above into 5 to 8 bundles of free stamens; anthers 1-celled. Ovary 5-celled, the cells with many ovules; style slender, obscurely 5-tipped. Capsule coriaceous or woody, 5-valved, dehiscent, densely woolly inside. Seeds small, subglobose, imbedded in the wool of the endocarp.

Medium-sized deciduous trees, aculeate or unarmed. Leaves digitate, 5 to 7-foliolate; leaflets entire. Inflorescence terminal, few-flowered, loosely paniculate. Peduncles 1 to 3-flowered; pedicels 3-bracteolate. Flowers white or purplish, the petals covered outside with dark-brown or purple scales.

Species 2, in Panama and Costa Rica.

## KEY TO THE SPECIES.

- Trunk unarmed; capsule ovoid, woody; flower about 15 cm. long; calyx glandular at the base..... *B. sessilis*.  
 Trunk thickly aculeate; capsule coriaceous, 5-angled, truncate; flower about 10 cm. long; calyx eglandular..... *B. fendleri*.

**Bombacopsis sessilis** (Benth.) Pittier.

*Pachira sessilis* Benth. Bot. Voy. Sulph. 70. 1844.

A middle-sized or small tree, unarmed, 10 to 20 meters high. Trunk slender, covered with a greenish, smooth, scaling bark. Branchlets rather slender, glabrous, verruculose.

Leaves 5 or 6-foliolate, entirely glabrous. Petioles 5 to 12 cm. long, slightly broadened at the base. Leaflets sessile or subsessile, obovate or oblong, long-cuneate at the base, rounded, emarginate, and mucronate at the tip, the middle one 7.5 to 13 cm. long, 3.5 to 4.5 cm. broad, the lateral ones 4.5 to 10 cm. long, 2 to 4 cm. broad. Margin entire. Venation prominent on both sides, the primary veins straight, anastomosed near the margin.

Flowers forming loose panicles at the ends of the branchlets, opening either when the tree is bare or when the leaves are fully developed. Peduncles usually simple, sometimes 2-flowered, 1 to 1.5 cm. long, 2.2 mm. thick, terete, glabrous. Calyx tubular or subconical, 12 to 13 mm. long, 6 mm. in larger diameter, truncate and obscurely 5-toothed, quite glabrous outside, provided at the base with 5 glands, pubescent inside at the bottom. Petals 14.5 cm. long, laciniate, about 7 mm. broad, rounded at tip, reflexed, minutely tomentose, purplish or greenish purple, at first reflexed, twisted after anthesis. Staminal tube 7.5 cm. long, 2.5 mm. wide, glabrous. Stamens about 6 cm. long, shorter than petals; filaments filiform, white, connate at the base into 6 to 8 bundles, each of these ramifying into 2 or 3 smaller bundles; anthers ovate-oblong, about 2 mm. long. Pistil 16.5 cm. long; ovary pilose-pubescent; style glabrous, deep pink.

Capsule oblong, rounded at both ends, smooth, 5-sulcate, green outside. Wool light brown. Seeds ovate, 11 mm. long, 7.5 mm. thick, chocolate-brown and black-dotted.

*Bombacopsis sessilis* is a morning bloomer.

PANAMA: "Isle of Taboga, Bay of Panama" (type). Around Culebra, Canal Zone, flowers, January 15, 1911, *Pittier* 2407, 2422. Hospital Grounds at Ancon, Canal Zone, flowers, February 15, 1911, *Pittier* 2726; fruit, March, 1910, *Chas. F. Mason*. (All in U. S. Nat. Herb.)

COSTA RICA: Buenos Aires, Diquís Valley, flowers, February, 1891, *Pittier*, Inst. Fís. Geogr. Costa Rica, no. 3924. (U. S. Nat. Herb.)



BOMBACOPSIS FENDLERI (SEEM.) PITTIER.

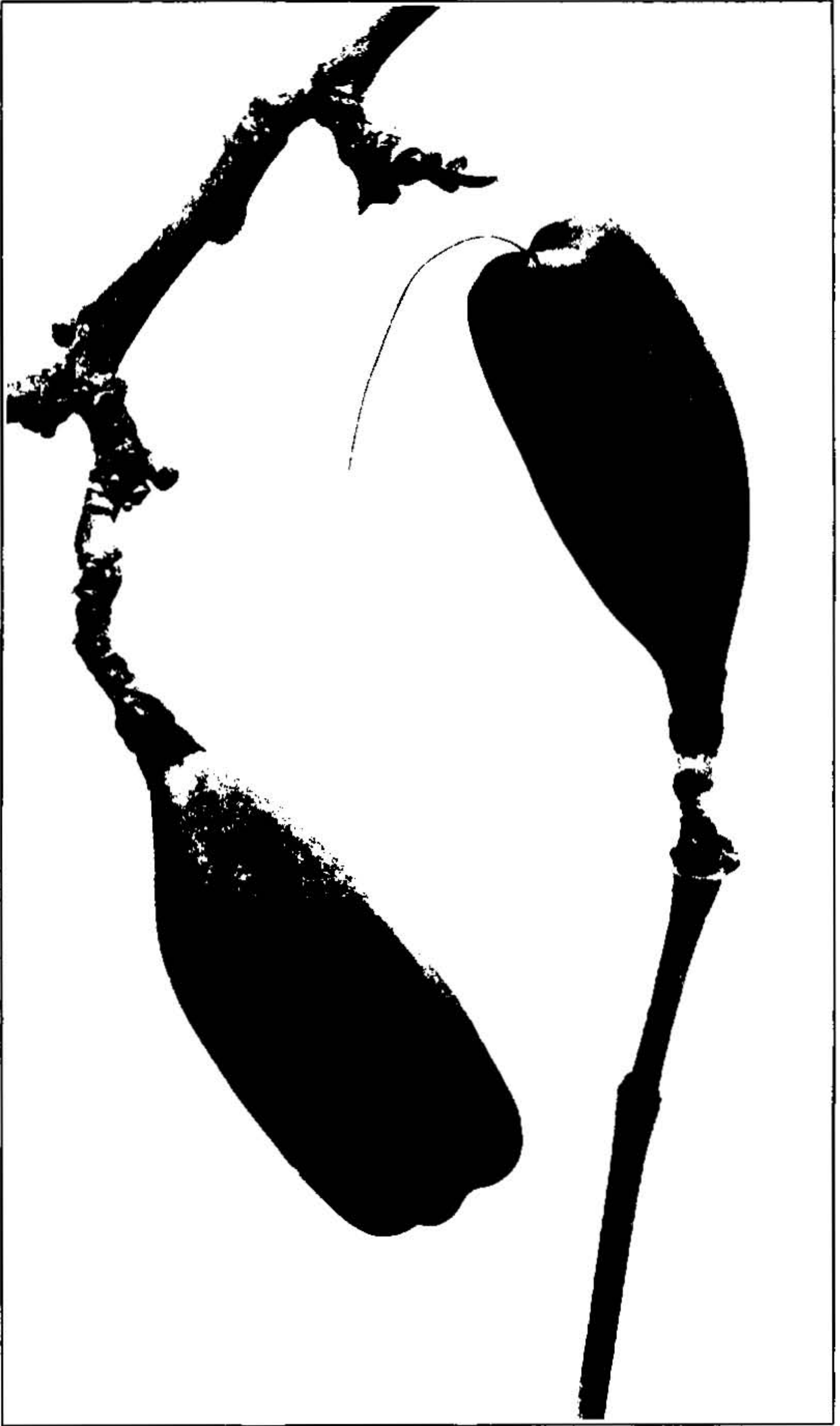


*BOMBACOPSIS FENDLERI* (SEEM.) PITTIER.



BOMBACOPSIS FENDLERI (SEEM.) PITTIER.





BOMBACOPSIS FENDLERI (SEEM.) PITTIER.



BOMBACOPSIS FENDLERI (SEEM.) PITTIER.

**Bombacopsis fendleri** (Seem.) Pittier.

PLATES 74-78.

*Pachira fendleri* Seem. Bot. Voy. Herald 83. 1852-57.*Bombax fendleri* Hemsl. Biol. Centr. Amer. Bot. 1:124. 1879.

A deciduous tree, very variable in size (height from 6 meters (*Williams* 615) to 30 meters (*Pittier* 2769); diameter of trunk 15 to 40 cm. Trunk and limbs aculeate; terminal branchlets unarmed.

Leaves entirely glabrous, 6 or 7-foliolate. Petioles slender, 4 to 5 cm. long. Petioles 2 to 3 mm. long, canaliculate. Leaflet blades oblong-cuneate, rounded-emarginate at tip, light green above and glaucous beneath, the terminal 9 cm. long, 4.5 cm. broad, the lateral about 4 cm. long and 2 cm. broad. Venation prominent on both sides of the blade; veins straight, connected at their ends. Margin entire.

Flowers loosely paniculate at the end of new branchlets. Pedicels glabrous, articulate, 5 mm. long, provided with 3 rounded, scaly, caducous bractlets about 1.5 mm. long. Calyx tubular, truncate, with irregular, often 5-mucronulate margin, eglandulose, obscurely tomentose, about 8 mm. long and 5 mm. in diameter. Petals inserted around a cuplike disk about 2.5 mm. long, slightly connate at the base, lacinate, reflexed, 8.5 to 10 cm. long, 6 to 9 mm. broad, rounded and often mucronulate at the tip, densely dark-dotted outside except on the covered margin, minutely pubescent and white inside. Staminal tube 2.2 cm. long and 3 to 4 mm. in diameter, softly hairy; filaments slender, white, 4 to 7 cm. long, free from the base, glabrous; anthers oblong-reniform, dorsifixed. Pistil glabrous, about 9 cm. long; ovary subglobose, about 2 mm. long; style slender, ending in a purple, minute, obscurely 5-tipped stigma.

Capsule ovoid, pentagonal and truncate, 6 to 7 cm. long and 4 cm. in diameter, greenish and smooth outside, dehiscent, the valves 1.5 to 2 cm. wide. Seeds small, ovate, smooth, brownish with black dots, wrapped in a silky, pale brown wool.

PANAMA: Chagres, Province of Colón, flowers, March, 1850, *Fendler* 310 (type collection); around Culebra, Canal Zone, flowers, February 14, 1911, *Pittier* 2769; vicinity of Penonomé, flowers and fruits, February-March, 1908, *R. S. Williams* 227, 615; forests of Juan Díaz, near Panama, flowers, January 25, 1911, *Pittier* 2549; cliffs along Caldera River, on road to Boquete, Chiriquí, at an altitude of about 700 meters, flowers and fruits, March 21, 1911, *Pittier* 3310; Agricultural Experiment Station at Matías Hernández, near Old Panama, January, 1915, *Pittier* 6940. (All in U. S. Nat. Herb.)

COSTA RICA: Not recorded, but probably to be found along the Pacific Coast.

EXPLANATION OF PLATES 74-78.—Pl. 74, aculeate trunk, reduced, Panama, *Pittier* 6940. Pl. 75, portion of same, natural size. Pl. 76, floral buds, flowers, stamens, petals, from same individual. Pl. 77, capsules, Punta Patíño, southern Darien, *Pittier*. Pl. 78, open capsule, from same tree. Pls. 76 to 78 natural size.

## FLACOURTIACEAE.

### A NEW SPECIES OF ZUELANIA AND AN OLD ONE OF ONCOBA.

**Zuelania roussoviae**<sup>1</sup> Pittier, sp. nov.

PLATE 79.

A deciduous tree, 10 to 25 meters high, the trunk 30 to 50 cm. in diameter at the base. Trunk about 8 meters high; crown rounded. Bark grayish and rugged on the trunk and main limbs, reddish, smooth, and sparsely verruculose on the young twigs.

Leaves on young shoots only. Petioles about 1 cm. long, pilose-pubescent. Leaf blade oblong, rounded at base, subacute, serrulate on the margin, pellucid-dotted, more or less pubescent above, hairy-tomentose beneath, 8 to 10 cm. long, 3 to 3.5 cm. broad. Stipules narrowly lanceolate, acute, about 6 mm. long, hairy, early caducous.

Inflorescence of 10 to 15-flowered clusters, in the defoliate axils at the end of the branchlets. Interpedicellary bracts small, ovate-acuminate, scarious, hairy on the

<sup>1</sup>This new species is named for Mrs. H. H. Rousseau, wife of the distinguished naval engineer member of the Panama Canal Commission, an enthusiastic student of tropical orchids.

back. Pedicels 12 to 14 mm. long, hairy. Sepals 5 (3+2), ovate, rounded at tip, 7 mm. long, conchoid, greenish or greenish white, hairy on the back except on the covered margins. Stamens 32 to 34; filaments 3.5 mm. long, glabrous or sparsely hairy; anthers elliptic or ovate-elliptic, nearly 2 mm. long, slightly emarginate at the base, obtuse at the tip, fixed halfway between the base and the middle and versatile. Pseudostaminodes (interspersed with the stamens or perhaps forming an outer circle) 34 to 42, stout, about 2 mm. long, clavate, sparsely covered with long hairs and more or less emarginate at tip. Pistil 3 mm. long, densely hairy except on the stigmatic surface; ovary rounded-ovoid, 1-celled, the numerous pedicellate ovules obpyriform and inserted on 3 parietal placentas; stigma sessile.

Fruit berry-like; peduncle 1.5 to 2 cm. long, hairy, surmounted by the persistent calyx; berry globose, shallowly 3-sulcate, about 3.5 cm. in diameter, yellowish green outside; mesocarp soft, juicy; endocarp like a 3-valved, coriaceous capsule. Seeds numerous, obovoid, angular, about 4 mm. long.

Type in the U. S. National Herbarium, no. 676846, collected on hills between Río Grande and Pedro Vidal, Canal Zone, on the road to Arraiján, altitude about 120 meters, flowers and young fruits, February 11, 1911, by H. Pittier (no. 2710).

PANAMA: (Besides type collection) near Pinogana, southern Darien, fruit, April, 1914 (Pittier, photograph); also around Matías Hernández, near Old Panama (Pittier).

Specimens of Fendler (no. 318), collected at Chagres, and of S. Hayes, from Paraíso, neither of which I have seen, have been identified with the type of the genus, *Zuelania laetioides* A. Rich., from Cuba and Jamaica. It is more likely, however, that they belong to the new species here described, which differs from the above by the obtuse and versatile anthers and the hairy, clavate pseudostaminodes. From *Z. crenata* Griseb. it is distinguished by the larger flowers and the villous ovary.

The wood of our species, which will be described in another paper, contains an abundant transparent and inodorous resin. At the time of its bloom the bare crowns of this tree are easily detected from far off, as they form white spots on the dark green background of the forest.

EXPLANATION OF PLATE 79.—Leaves and fruit, southern Darien. From the Pittier specimen of April, 1914, after being photographed preserved in alcohol. Natural size.

*Oncoba laurina* (Presl) Warb. in Engl. & Prantl, Pflanzenfam. 3<sup>6a</sup>: 19. 1894.

FIGURE 89.

*Lindackeria laurina* Presl, Rel. Haenk. 2: 89. pl. 65. 1830.

*Mayna laurina* Benth. Journ. Linn. Soc. Bot. 5: Suppl. 2. 81. 1861.

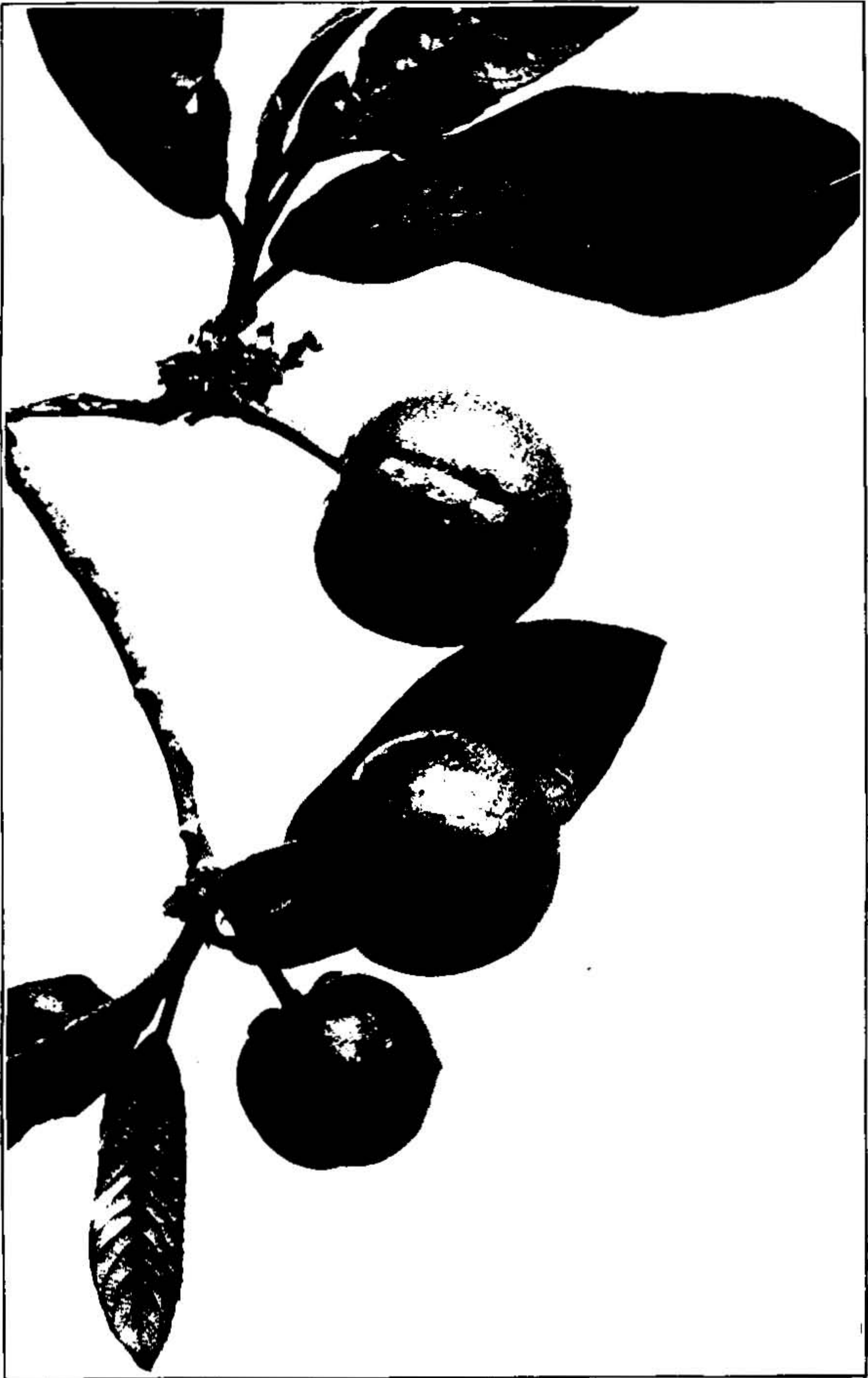
A tree 12 to 15 meters high, the trunk 30 to 35 cm. in diameter, with radiate branching beginning about 3 meters above the ground, and a pyramidal crown. Bark gray, more or less shaggy. Branchlets striate, smooth.

Leaves alternate, petiolate, entirely glabrous, or subpuberulent beneath. Petioles 6 to 9 cm. long, narrowly sulcate, subterete. Leaf blades oblong-lanceolate, 12 to 28 cm. long by 6 to 9.5 cm. broad, subacute at the base, acuminate, olive-green and almost shiny above, paler beneath; nervation little prominent above, more so on the lower face; primary veins distant and anastomosing along the entire margin. Stipules none or early caducous.

Inflorescence terminal, racemose, simple or branched at the base, few-(2 to 10-)flowered, glabrous, shorter than the leaves. Peduncles shorter than the petioles; rachis more or less angulate. Pedicels 0.5 to 1.5 mm. long, slender. Sepals 5, elliptic or ovate-elliptic, 7 mm. long, rounded or subacuminate at tip, subpubescent on the back. Petals 5, narrowly elliptic, about 10 mm. long and 3.5 mm. broad, white. Stamens 28, free or scarcely connate at the base, glabrate, 5.8 mm. long; filaments



FIG. 89.—*Oncoba laurina*.  
a, Petal; b, stamens; c,  
pistil. Scale 3.



ZUELANIA ROUSSOVIAE PITTIER.

3.5 mm. long; anthers 2.8 mm. long, basifix, elliptic-oblong, emarginate at the base, bifid at tip. Pistil about 7 mm. long; ovary softly echinate and pubescent, rounded, 1-celled, the many ovules inserted on 3 parietal placentas; style slender, 6 mm. long, pubescent on its lower half; stigma inconspicuous, obscurely 3-lobulate.

Fruit a rounded, 1-celled, echinate capsule, 3-dehiscent, about 1 cm. in diameter, borne on pedicels about 1.5 cm. long and surmounted by the persistent style, this usually shorter than the bristles, these about 8 mm. long, thick at the base, long-attenuate, hispid. Seeds 1 to 4, ovoid, subangulate, about 4 mm. long.

SOUTH MEXICO: Western coast, *Haenke* (type).

COSTA RICA: Coastal plain of Banana River, fruit, January, 1898, *Pittier*, Inst. Fís. Geogr. Costa Rica, no. 12167; Térraba, fruit, February, 1891, *Tonduz*, Inst. Fís. Geogr. Costa Rica, no. 4000; Mano de Tigre, fruit, April, 1898, *Pittier*, Inst. Fís. Geogr. Costa Rica, no. 12104. (All in U. S. Nat. Herb.).

PANAMA: Vicinity of San Felix, eastern Chiriquí, flowers and fruit, December, 1911, *Pittier* 5228 (U. S. Nat. Herb.); common in Veraguas in forests (*Seemann*)<sup>1</sup>; Agua Clara, Trinidad River, Canal Zone, flowers, July 19, 1911, *Pittier*, 3991 (U. S. Nat. Herb.); Panama (*Duchassaing*); railroad station at Gatun, Canal Zone, flowers, December 31, 1860, *Hayes* 15, 18 (U. S. Nat. Herb.).

COLOMBIA: Muzo, around the emerald mines (*Goudot*).<sup>2</sup> This indication is doubtful.

According to *Seemann*<sup>1</sup> the flowers of this species have never been described, and as only *Presl's* original description, limited mainly to the leaves and fruits, could be found, it was thought that a complete description had its place here.

## SAPOTACEAE.

### SPECIES, MOSTLY NEW, OF CHRYSOPHYLLUM, LUCUMA, AND BUMELIA.

*Chrysophyllum panamense* Pittier, sp. nov.

FIGURE 90.

A medium-sized tree, with rounded crown. Bark grayish, smooth on the trunk, minutely verruculose on the branchlets. Young shoots, leaves, and inflorescences more or less brownish-pubescent.

Leaves rather large, entirely glabrous or more or less pubescent on the petiole, costa, and veins, dark green above and grayish beneath. Petioles 10 to 12 mm. long, deeply canaliculate. Leaf blade elliptic-acuminate, shortly pointed at base, 7 to 21 cm. long, 4 to 8 cm. broad. Costa deeply impressed, the 20 to 24 primary nerves hardly distinct above, both prominent beneath.

Flowers about 5 mm. long, 16 to 30 and more in axillary clusters. Pedicels and calyx silky-pubescent, the former 6 mm. long. Sepals 5 (2+3), broadly ovate, rounded at tip, 1.5 mm. long, thick, and coriaceous. Corolla greenish yellow, about 4.8 mm. long; lobes 5, short (1.2 mm.), pubescent on the outside, with irregularly denticulate margin. Stamens 5; anthers apiculate. Ovary 5-celled, short-pubescent; style about 1 mm. long, smooth, and ending in 5 very short but distinct stigmas.

Fruit not known.

Type in the U. S. National Herbarium, no. 679089, collected along the Sirri River, Trinidad Basin, Province of Colon, Panama, near sea level, flowers, July 20, 1911, by H. Pittier (no. 4005).

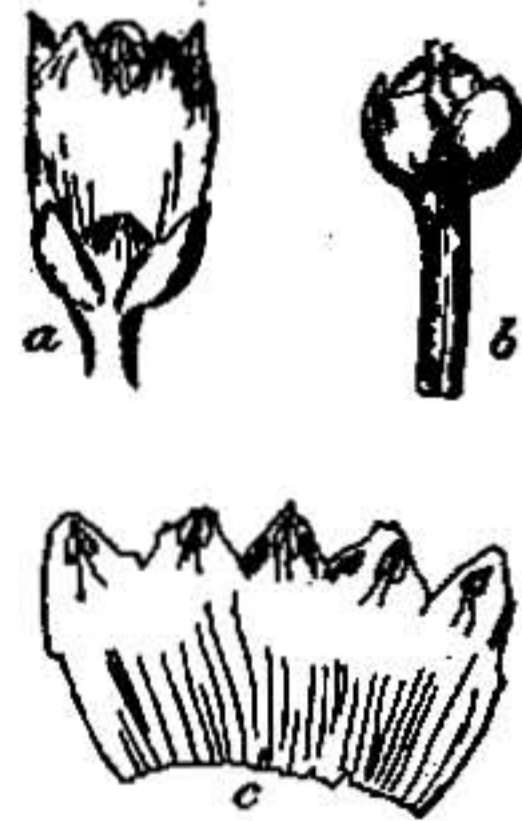


FIG. 90.—*Chrysophyllum panamense*. a, Flower; b, same deprived of the corolla; c, the corolla spread open to show stamens. Scale 3.

<sup>1</sup> Bot. Voy. Herald 79. 1852.

<sup>2</sup> Triana & Planch. Prodr. Fl. Novogran. 1: 94. 1862.

**Lucuma sclerocarpa** Pittier, sp. nov.

PLATE 80. FIGURE 91.

Section *Macroluma*. A large tree, about 25 meters high, lactescent. Trunk usually straight, 30 to 40 cm. in diameter at base; bark smooth, grayish. Young twigs sparsely ferruginous-pubescent, slightly sulcate.

Leaves alternate, petiolate, entire, membranous. Petiole about 1.5 cm. long, rather thick, broadly canaliculate, at first puberulous. Leaf blades ovate-elliptic or elliptic, 10 to 25 cm. long, 4 to 9 cm. broad, rounded and subdecurent at the base, acuminate with a rounded tip, glabrous and pale green above, sparsely villous, lighter and slightly brownish beneath. Nervation pinnate, interreticulate, slightly prominent above, more so beneath, the costa and veins also sparsely hairy beneath; primary veins alternate, 18 to 20 on each side of the costa.

Flowers pedicellate, in clusters of 3 to 6 on the defoliate axils of the last year's growth. Bracts very small, ferruginous-pubescent. Pedicels 1 to 3 mm. long, scarious-pubescent, mostly bearing at the base 2 minute, ovate, clasping bractlets. Sepals 6, free, the 2 exterior ones ovate, half smaller and completely scaly-pubescent outside,

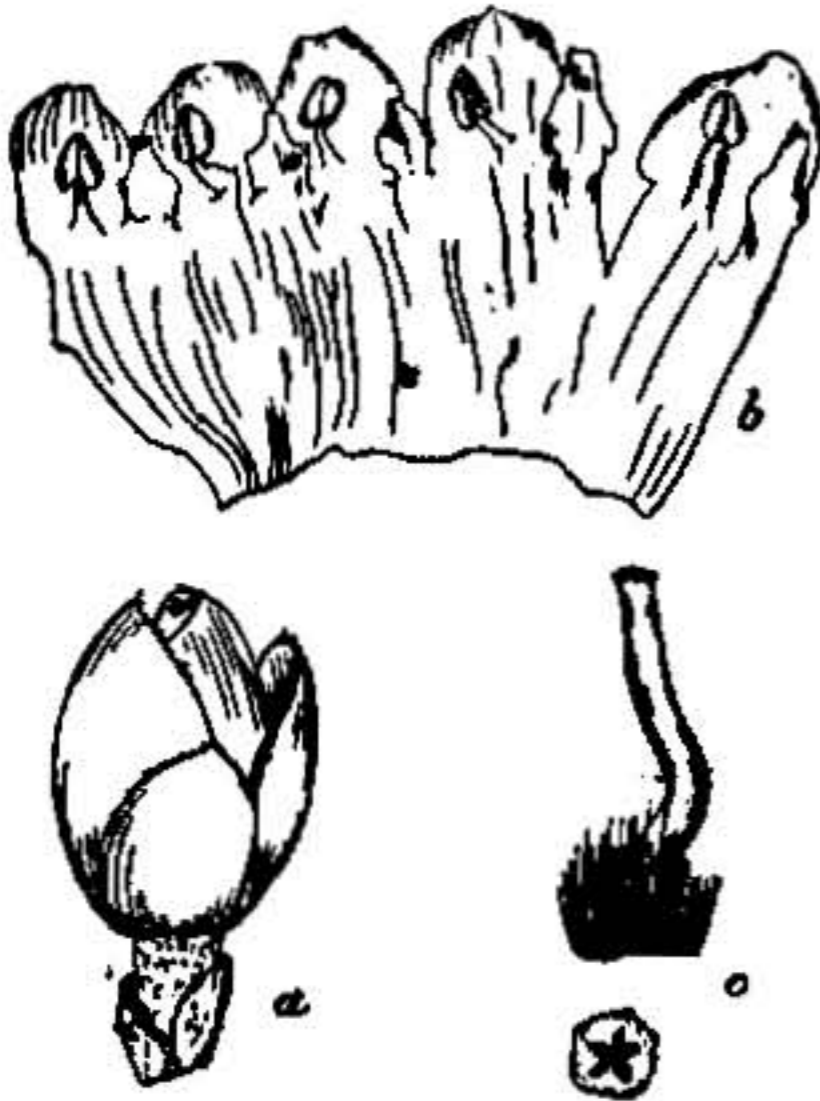


FIG. 91.—*Lucuma sclerocarpa*. a, Floral bud, showing calyx; b, corolla spread open, with stamens and staminodes; c, pistil and cross section of ovary. Scale 3.

the 4 interior ones also ovate, 5 to 6 mm. long, pubescent outside on the exposed parts only, ciliate on the scarious margin, and silky hairy inside. Corolla about 8 mm. long, glabrous, yellowish white, with a broad tube and 5 irregularly rounded, subtruncate lobes about 3 mm. long. Staminodes alternating with the corolla lobes, free, more or less ovate, subauriculate at the base, narrowing into an irregularly truncate tip. Stamens very short (1.5 to 2 mm. long), glabrous; filaments rather thick and broader at base; anthers basifix, ovate, more or less emarginate or subhastate at the base. Pistil about 7 mm. long; ovary ovoid, 5-celled, densely hairy; style smooth, slightly exserted, more or less distinctly divided at the tip into 5 minute, papillose lobules.

Fruit a sclerous, sessile, ovate, obscurely sulcate berry, attenuate at the base, yellowish and hard at maturity, 7 cm. long and 4.5 cm. in diameter. Seed ovoid, about 4 cm. long and 2.5 cm. in diameter, brown, shiny, the umbilical area very large and extending from one end to the other, the extremity

of the area opposite the hilum bearing a small, salient, ovate scutellum.

Type in the United States National Herbarium, no. 679508, collected along the Sperdi Creek, near Puerto Obaldía, San Blas Coast, Panama, flowers and fruits, September 3, 1911, by H. Pittier (no. 4357), with photograph of fruit.

This species is a near relative of *Lucuma procera* Mart., with which it has in common the bracteolate pedicels, the sepals hairy inside, and the general characters of the section *Rivicoa*. But it differs in the shape and size of the leaves, the much shorter filaments of the stamens, and the shape of the staminodes, and probably in its ligneous or coriaceous fruit, a feature not yet signalized, I think, in this genus. It is a subgregarious species, apparently common in the forests of the San Blas Coast.

EXPLANATION OF PLATE 80.—Fruits, San Blas Coast, Panama. Material from same tree as floral specimens. Natural size.

**Lucuma standleyana** Pittier, sp. nov.

FIGURE 92.

Section *Guapeba*. A small tree, 4 to 5 meters high, with a slender trunk and scanty, diffuse branching. Bark brownish gray, rugose.

Leaves clustered at the ends of the branchlets, oblong, gradually cuneate-attenuate at the base into a broad petiole 6 to 8 mm. long, short-acuminate at the tip, 7 to 20



FRUIT OF LUCUMA SCLEROCARPA PITTIER.



cm. long, 2.5 to 7 cm. broad, smooth and finely reticulate above, grayish velvety with prominent venation beneath; primary veins 15 to 17; margin entire.

Flowers small, subsessile, 1 to 4 in the axils of the leaves or on the defoliate branchlets, provided at the base with about 4 brownish scarious bracteoles. Sepals 4, in alternate valvate pairs, 3 mm. long, ovate, the 2 exterior ones brownish-velvety outside, the interior petaloid. Corolla tubular, 3 mm. long or slightly longer than the calyx, white, glabrous, 4-lobulate, the lobes obtusely rounded. Stamens 4, inserted at the base of the corolla and free, glabrous, about 3 mm. long; filaments rather thick; anthers extrorse, ovate-acuminate, cordate at base. Staminodes 4, inserted in the sinuses of the lobules, about 0.7 mm. long, acute at the tip. Pistil about 2 mm. long; ovary subspherical, 4-celled, surrounded by long straight hairs; style smooth, rounded at tip.



FIG. 92.—*Lucuma standleyana*. a, Sepal; b, part of corolla, showing also stamens and staminodes; c, pistil. Scale 6.

Young fruits pomiform, villous; mature fruit not known.

Type in the U. S. National Herbarium, no. 678879, collected on Mamei Hill, Canal Zone, Panama, near the top, about 80 meters above sea level, flowers, July 6, 1911, by H. Pittier (no. 3807).

This species seems to be closely allied to *Lucuma glomerata* Miquel, having in common the low-inserted stamens and the silvery indument of the lower face of the leaves, but differing by the number of the primary veins and by the flowers being slightly larger, the margin of the sepals and lobules of the corolla smooth, and the latter more coherent and covering the narrower staminodes.

#### *Lucuma sambuensis* Pittier, sp. nov.

A small, lactescent tree, about 10 meters high, the trunk 35 cm. in diameter at the base. Crown pyramidal, with radiate branching. Bark reddish gray, smooth. Young twigs sulcate, glabrous.

Leaves alternate or in whorls at the end of the young twigs, petiolate, entirely glabrous. Petiole thick, 1 to 1.5 cm. long, broadly canaliculate. Leaf blades obovate or oblanceolate, cuneate at the base, acuminate at tip, 20 to 25 cm. long, 5 to 9 cm. broad, light green above, paler beneath. Midvein salient on both faces, more so beneath; primary veins strongly arcuate, 13 to 15 on each side, subimpressed on the upper face, very salient on the lower one; margin quite entire.

Flowers not known.

Fruit ovoid, sessile or subsessile, fleshy, very lactescent, 5.5 cm. long, 4 cm. in diameter, densely pilose-pubescent, and obscurely sulcate from base to top.

Type in the U. S. National Herbarium, no. 715896, collected on the foothills of the Garagará Mountains, in the Sambú Valley, southern Darien, Panama, fruit, February 7, 1912, by H. Pittier (no. 5621).

This species does not answer to the description of any of those known, but belongs very likely to the section *Macroluma*, together with *L. sclerocarpa*. In the absence of the flowers its status can not be definitely settled.

#### *Bumelia obovata* A. DC. in DC. Prodr. 8: 191. 1844.

FIGURE 93.

A small tree, up to 6 meters high, the trunk seldom over 20 cm. in diameter, branched from close to the base. Bark more or less scaly, brownish gray. Branchlets usually ending in an elongate, conical thorn.

Leaves small, deciduous, glabrous, 2 to 6-clustered (in the first stage) or single. Petiole about 8 mm. long. Leaf blades obovate, cuneate at the base, rounded or emarginate at tip, olive-green and shiny above, pale beneath, when mature about 4

cm. long and 2 cm. broad. Costa subimpressed above, salient beneath, the fine primary veins forming with it an angle of about  $40^\circ$ .

Flowers entirely glabrous, in clusters of 2 to 8 on the foliar nodes. Pedicels 3 to 6.5 mm. long. Sepals 5, ovate, 2 to 2.5 mm. long, persistent. Corolla white, about

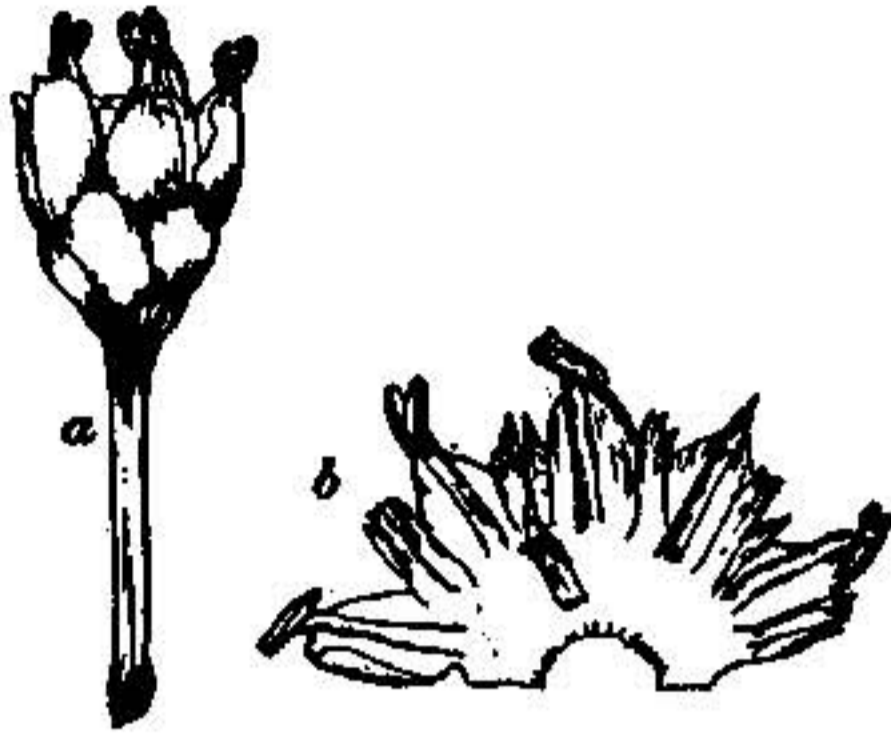


FIG. 93.—*Bumelia obovata*. a, Flower; b, spread corolla. Scale 3.

4.2 mm. long, deeply cleft; exterior lobes 5, oblong, with smooth margin; interior lobes 10, lanceolate, acute or bicuspidate, little shorter than the exterior ones, each pair inserted in the sinuses between these. Stamens 5, inserted in the middle of the tube; anthers ovate-lanceolate, dorsifix, exserted. Staminodes nearly as long as the exterior lobes of the corolla, ovate, rounded at tip, with a slightly denticulate margin. Pistil 3.5 mm. long; ovary smooth, globose, 5-celled, glabrous but with a crown of stiff hairs at the base; style slender, glabrous, persistent, ending in a minute papillose stigma.

Fruit an ovoid, 1-seeded berry, with thin pulp. Seed ovoid, brown and shiny outside, with the small umbilical area near the apex.

PANAMA: Aguadulce, along the outskirts of the tidal belt, flowers, December 5, 1911, Pittier 4988 (U. S. Nat. Herb.).

## SYMPLOCACEAE.

### A NEW SPECIES OF SYMPLOCOS.

*Symplocos chiriquensis* Pittier, sp. nov.

FIGURES 94, 95.

Section *Eusymplocos*, subsection *Ciponimastrum*. A tree up to 30 meters high. Trunk straight, 50 cm. in diameter or less; bark grayish. Floriferous branchlets with purplish green, quite smooth, bark.

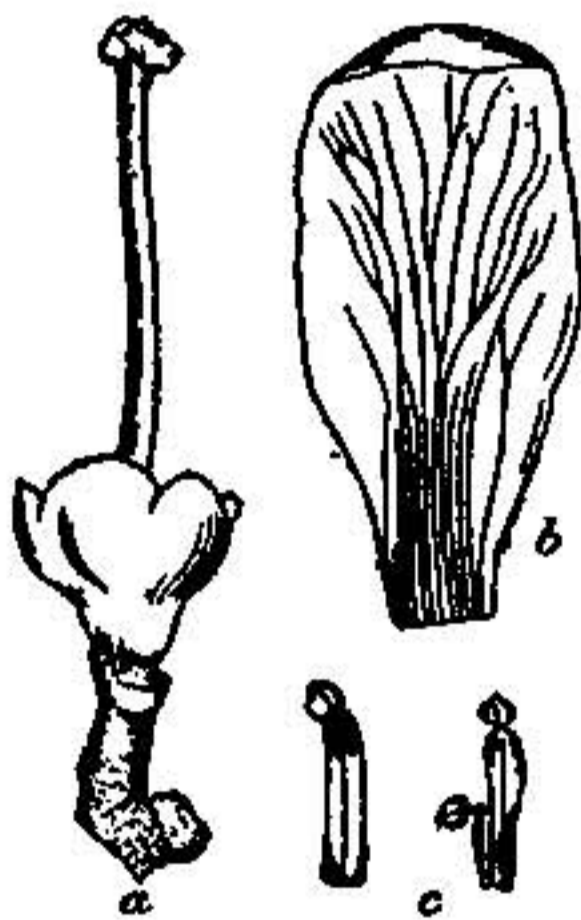


FIG. 94.—*Symplocos chiriquensis*. a, Calyx and style; b, petal; c, stamen. Scale 3.

Leaves only on new growth at ends of branchlets, alternate, petiolate, entirely glabrous (though covered with gray hair in young buds). Petioles 7 to 10 mm. long, canaliculate, subdecurrent on the branchlets. Blades membranous, 5 to 10 cm. long, 2.5 to 3.5 cm. broad, elliptic, cuneate at base, more or less rounded-acuminate at tip, almost shiny above, a shade paler and with prominent venation beneath; margin crenate, subrevolute.

Inflorescences axillary on the young branchlets. Racemes 1 to 5-flowered, 2 to 4 times as long as the petioles;

rachis minutely hairy. Flowers odorous. Pedicels 0 to 1.5 mm. long. Calyx campanulate, 4 or 5-lobate, surrounded at base by 3 to 5 very caducous, deltoid, apiculate bractlets, about 1 mm. long and pilose-ciliate on the margin; calyx lobes broadly rounded, ciliate on the margin. Corolla pink, 10 mm. long, the tube equal in length to the calyx lobes, the 5 petals obovate-oblong, 4 to 5 mm. broad, more or less ciliate toward the base and apparently not reflexed. Stamens numerous (about 35), 3-seriate, free at the upper part, included, but the longest not much shorter than the corolla; free part of the filaments flattened, finely apiculate at the tip; anthers

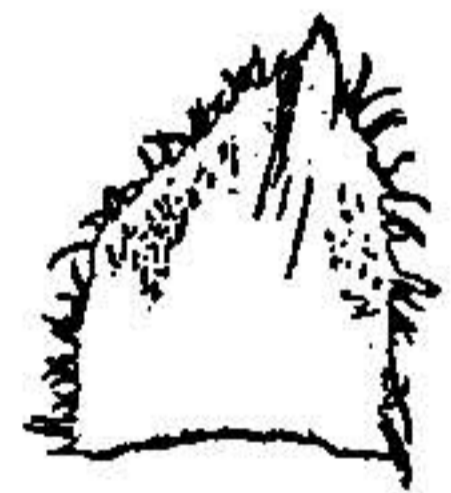


FIG. 95.—*Symplocos chiriquensis*. Bractlet. Scale about 20.

cordate. Ovary silky-hairy, 4 or 5-celled, each cell 2-ovulate; style slender, about 7 mm. long, slightly hairy at the base, smooth above; stigma capitellate, obscurely multilobulate and papillose.

Fruits not known.

Type in the U. S. National Herbarium, no. 677388, collected in forest along the Caldera River near El Boquete, Chiriquí, Panama, at an altitude of about 1,100 meters, flowers, March 4, 1911, by H. Pittier (No. 2994).

Very likely the same species which was collected in Veraguas by Seemann and cited in his *Flora of Panama*<sup>1</sup> as *Symplocos martinicensis* Jacq. No mention of this locality is made in Hemsley's *Biologia Centrali-Americana* and Brand, the monographer of the family Symplocaceae in the *Pflanzenreich*, does not seem to have seen Seemann's specimens. Our tree differs from *S. martinicensis* by its smaller leaves, its peculiar ciliate-apiculate bractlets, the more broadly rounded calyx lobes, and the rather dense silky-hairy pubescence of the ovary.

## VERBENACEAE.

### NEW SPECIES OF CITHAREXYLUM AND VITEX AND AN OLD ONE OF VITEX.

*Citharexylum macranthum* Pittier, sp. nov.

A forest tree, 25 to 30 meters high, the trunk up to 50 cm. in diameter at the base. Trunk straight, covered with a reddish rugose bark. Crown elongate; limbs slightly ascending. Terminal branchlets 4 or 6-angled, thick, glabrous, more or less fistulose.

Leaves thin, petiolate, entirely glabrous, usually alternate but often ternate at the end of the younger, floriferous shoots. Petioles 1.5 to 3 cm. long, more or less broadly sulcate. Leaf blades ovate to elliptic, 10 to 24 cm. long, 6 to 9 cm. broad, more or less rounded-attenuate and provided with two large glands at the base, subacute or rounded at tip, smooth above, finely reticulate between the salient veins beneath; margin entire.

Inflorescence subterminal with the racemes axillary, usually ternate, on the 2 or 3 upper nodes of the branchlets. Rachis slender, glabrous or minutely hirsute, 12 to 25 cm. long. Flowers distinctly zygomorphous and large for the genus (about 17 mm. long). Pedicels very short (not over 0.5 mm. long), minutely hirtellous. Calyx 5 mm. long, salver-shaped, irregularly 5-toothed, subglabrous or finely pubescent. Corolla 15.5 to 17 mm. long, white, glabrous; tube broad, cylindrical, slightly arcuate, about 11 mm. long; lobes 5, well developed, the median one irregularly rounded-acuminate with a narrow claw, the lateral ones elongate, conchiform and obtusely pointed at tip. Stamens included, inserted below the middle of the tube, entirely glabrous; filaments slender; anthers elliptic, emarginate at base, rounded at tip. Pistil entirely glabrous, 4 mm. long; ovary ovoid, 4-celled, each cell 1-ovulate; style 1 to 1.5 mm. long; stigma capitellate, subbilobate, papillose on the surface.

Fruit not known.

Type in U. S. National Herbarium, nos. 678974 and 679301, collected along Río Fató, above Nombre de Dios, Province of Colón, Panama, in high forest, flowers, July 8 and August 16, 1911, by H. Pittier (nos. 3897 and 4199).

This tree departs from all hitherto described species of the genus by the ternate leaves and racemes of the floral branchlets, the unusually large corollas, the stamens inserted well in the lower half of the corolla tube, and the very short pistil. It shares with *C. macradenium* Greenm., the peculiarity of having very large glands at the base of the leaf blade. The core of the trunk is of a dirty yellow color. The wood is hard, but tough, and little used. The tree is called "iguanero" by the natives.

<sup>1</sup> Bot. Voy. Herald. 166. 1854.

*Vitex masoniana* Pittier, sp. nov.

FIGURE 96.

Section Limia. A tree about 25 meters high, with a straight trunk and grayish-white bark, longitudinally rimose. Limbs ascending; crown elongate. Young foliferous and floriferous shoots tetragonous and subsulcate, covered with a dense yellowish-brown pubescence.

Leaves developed at time of flowering, 5-foliolate. Petioles brownish-puberulous, 5.5 to 6 cm. long, broadly canaliculate; petiolules brownish-pubescent, 2 to 6 mm. long, the exterior ones being shortest and the middle one longest; leaflets elliptic-lanceolate, acute at both ends, glabrous and almost shiny, with the venation deeply impressed above, brownish hairy tomentose with the venation strongly prominent beneath; margins entire, revolute; middle leaflet blade 15 to 20 cm. long, 3.5 to 4 cm. broad; lateral leaflets 8 to 10 cm. long, 3 cm. broad.



FIG. 96.—*Vitex masoniana*.  
a, Floral bud, showing calyx; b, pistil; c, stamens. Scale 3.

Cymes paniculate, the rachis densely brownish-pubescent. Panicles about 15 cm. long, its branchlets opposite or subopposite. Peduncles 5 cm. long; middle flower of the terminal cymes sessile, or almost so, the pedicels of the lateral flowers 2 to 3 mm. long. Bractlet ovate-lanceolate, obtuse, hairy, 2 mm. long. Calyx campanulate, deeply 5- (or 4-) toothed, hairy outside, about 3.5 mm. long; teeth acute-triangular, 1.5 to 2 mm. long, the intervening sinuses rounded at apex. Corolla lilac-colored, densely puberulous outside, except at base of tube, hairy inside at the insertion of the stamens and barbate at the base of the inferior lobe; tube short (about 3 mm.) and broad; inferior lobe suborbicular (4 mm. broad, 3.5 mm. long, with a narrow claw); lateral lobes shorter, ovate-rounded, the upper lobes smallest, triangular and subacute. Stamens exserted, 2 to 3 mm. long; filaments thick, long-hairy; anther cells ovoid-oblong, diverging. Ovary globose-depressed, hairy; style 4.5 mm. long, smooth, shortly bifid at tip.

Berry globose-depressed, puberulous, surrounded by the enlarged calyx.

Type in the U. S. National Herbarium, no. 679649, collected in the forests of Gasparabana, upper Mamoni Valley, above Chepo, Province of Panama, Panama, at an altitude of about 200 meters, flowers and fruits, October 6, 1911, by H. Pittier (no. 4489).

This species seems to have its nearest affinities with *Vitex multiflora* Miquel. The leaves, however, are 5-foliolate, the calyx distinctly 5-toothed, and the corolla quite distinct. Named in honor of Lieut. Col. Chas. F. Mason, chief health officer of the Canal Zone.

*Vitex floridula* Duchass. & Walp. Ann. Bot. Syst. Walp. 3: 240. 1852.

A tree of medium size, with a straight trunk, covered with grayish, longitudinally rimose bark. Branchlets more or less puberulous at first, later subglabrate.

Leaves undeveloped at the time of flowering, 3-foliolate with the lateral leaflets easily caducous, pubescent and turning black through desiccation when young, quite smooth, coriaceous and paler beneath at maturity. Petioles slender, 3 to 4.5 cm. long. Middle leaflet much larger than the lateral ones, 5 to 13 cm. long, 3 to 6 cm. broad, its petiolule 7 to 13 mm. long, the blade ovate-elliptic, ovate, or obovate, subacute at the base, acute, rounded, or emarginate at the tip, the margin entire and revolute. Petiolules of the lateral leaflets 4 to 7 mm. long, the blades 4 to 7 cm. long, 2 to 4 cm. broad, elliptic-acute or ovate and more or less rounded at tip.

Cymes axillary, shorter than the petioles of the mature leaves, 3 or 4 times divided. Rachis finely pubescent. Pedicels 1 to 3 mm. long, the middle one shortest. Bractlet linear, obtuse, 1.5 mm. long, hairy, deciduous. Calyx pubescent outside, smooth inside, cupuliform, subtruncate, with 5 irregular teeth, about 3 mm. long. Corolla

subbilabiate, bluish purple, hairy outside except at base of tube; tube about 5 mm. long, narrow at base and ventricose; lobes hairy on the exposed upper side, the inferior one larger, orbicular, with barely a few long hairs at the base, the lateral and superior ones almost even, obovate-rounded. Stamens long-exserted; filaments slender, flattened, barbate at the base, respectively 5.5 and 6.5 mm. long; anther cells egg-shaped. Ovary globose, quite smooth; style up to 9 mm. long, smooth.

Berry egg-shaped, about 14 mm. long and 10 mm. in diameter, bluish black.

PANAMA: Isthmus of Panama, *Duchassaing* (type); forests on dry limestone hills around Alhajuela, Chagres Valley, flowers and fruit, May 13, 1911, *Pittier* 3477 (U. S. Nat. Herb.); Hospital Grounds at Ancon, Canal Zone, flowers, February, 1911, *Chas. F. Mason* 10 (U. S. Nat. Herb.); Empire, Canal Zone, flowers, March 16, 1912, *Christopherson* 153 (U. S. Nat. Herb.); Sabana de Juan Corso, near Chepo, Province of Panama, mature leaves only, October, 1911, *Pittier* 4683 (U. S. Nat. Herb.).

Although the specimens do not absolutely agree, especially with reference to the calyx, with the original description of *Duchassaing* and *Walpers*, I do not hesitate to identify them with their *Vitex floridula*. This is the species of common occurrence in the district explored by *Duchassaing* and the only one known which has close affinities with *V. divaricata* *Swartz*.

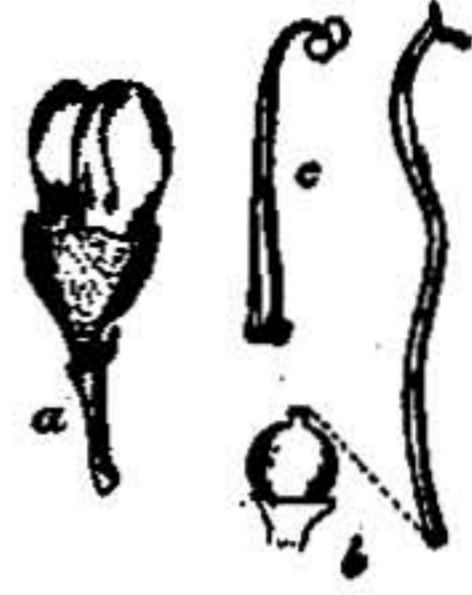


FIG. 97.—*Vitex floridula*. a, Floral bud, showing calyx; b, pistil; c, stamen. Scale 3.