

# NEW AND CRITICAL POLYGONACEAE, GUTTIFERAE AND LECYTHIDACEAE FROM SURINAM

BY

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## POLYGONACEAE.

The comparative morphology of the genera belonging to this family has been extensively treated by Gross in Engl. Bot. Jahrb. XLIX (1913) p. 234—339.

*Antigonon leptopus* W. Hook. et Arn., Bot. Beechey's Voyage (1840) p. 308, t. 69.

Serial buds, i.e. the development of both an inflorescence and a lateral shoot in the axil of a leaf, are of frequent occurrence in this species.

### *Coccoloba* L.

For particulars about the type-species of the genus and Browne's name *Coccolobis* see Fawcett and Rendle in Journ. Bot. LI (1913) p. 123.

*Coccoloba micropunctata* Eyma, n. sp. — Fig. 1 (p. 2)

Frutex volubilis, ramulis solidis, striatis, brunneo-griseis, lenticellis brunneis munitis. Ochreae anguste tubulosae, longe acuminatae, 1 ½ cm longae vel majores, minutissime brunneo-puberulae, deciduae. Foliorum petioli infra basin ochrearum inserti, 11—18 mm longi, laminae late ellipticae, longitudine latitudinem 1 ¼-plo superante, apicem et basin versus rotundatae, apice minutissime acuminatae, basi truncatae vel minute subcordatae, circ. 10—13 cm longae, coriaceae vel subcoriaceae,

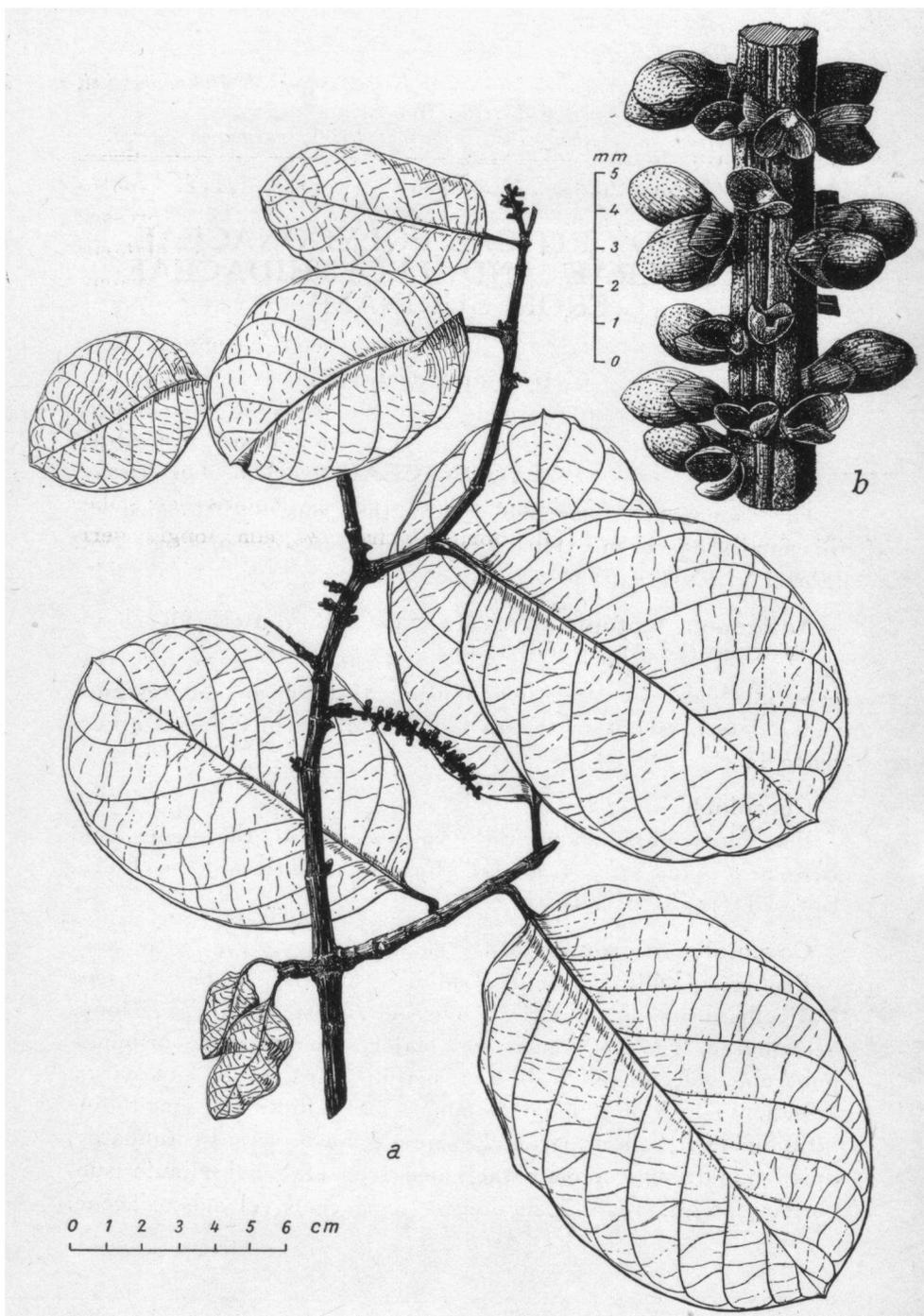


FIG. 1. *Coccoloba micropunctata* Eyma. Stahel 77: a habit; b portion of inflorescence.

supra glabrae, subtus ad nervos sparse pilosae, sub lente dense glanduloso(?)-punctulatae, statu sicco supra fuscae, subtus brunneae, nervis primariis supra impressis, subtus expressis, prope marginem conspicue arcuatim connexis, nervis secundariis minoribusque supra prominulis tenuisque, subtus acute prominentibus, nervulis dense reticulatis.

Inflorescentiae axillares et terminales, pseudoracemosae, circ. 5 cm longae; rhachis profunde sulcata, minutissime puberulo-tomentosa punctulataque; noduli 1-flori; bractee triangulares  $\frac{1}{3}$ — $\frac{1}{2}$  mm longae; ochreolae circ.  $1\frac{1}{2}$  mm longae, fere usque ad basin in lobis 2 elliptico-oblongis divaricantibus fissae, chartaceae, rigidae, siccitate fragiles, extus minutissime puberulo-tomentosae; pedicelli floriferi circ.  $\frac{1}{2}$  mm longi; perianthium viride, tubo circ. 1 mm longo, lobis extus dense glanduloso(?)-punctulatis circ. 1 mm longis. Fructus ignotus.

Guiana batava, ad flumen Suriname superius prope Goddo (Stahel n. 77, typus, cum alabastris floribusque lectus mense Januario anni 1926, in Herb. Rheno-trajectino [Utrecht]).

This species resembles *C. excelsa* Benth., but the latter differs in its narrow-tubular, membranous ochreolae, and in its non-punctulate leaves and inflorescences.

*C. firma* Mart. in sched. [K, NH, sub *C. populifolia*] differs in its longer inflorescences ( $\pm 17$  cm l.), its glabrous leaves on petioles inserted above the base of the ochreae, and in its pedicels exceeding the ochreolae.

*C. populifolia* Wedd. (Blanchet 1486, Bahia [Geneva, Conservatoire]) has the leaves very densely reticulate, almost scrobiculate, and the petioles inserted above the base of the ochreae.

*C. Riedelii* Lindau (type-specimen: Riedel 613, Ilheos, Bahia [dupl. D]) differs in the much denser pubescent indumentum of its inflorescence and of the lower surface of its leaves,

in its pale, rimose, not striate branchlets, and in its larger bracts (1 mm l.).

*C. Grisebachiana* Lindau, from Trinidad, is said to have the ochreae ribbed with persistent costae.

*Coccoloba mollis* Casar., Nov. Stirp. bras. Dec. VIII, 72 (1842—1845); — *C. polystachya* Wedd. in Ann. Sc. nat. 3e sér. XIII (1850) p. 261.

In the Fl. Bras. V. 1. (1855) p. 43, Meisner referred *C. mollis* with ? to *C. polystachya*, whereas in D.C. Prodr. XIV (1856) p. 151 he treats it as a variety of this species. Lindau subdivides *C. polystachya* into 2 varieties, viz.  $\alpha$  *glabra* Lind. (= *C. paniculata* Meisn.) and  $\beta$  *pubescens* Lind. (= *C. mollis* Casar.), and mentions among the plants belonging to the latter examined by him, e.g. Casaretto 2218 (Bahia, Brazil) and Kegel 1339 (Surinam) as well as Martius 1242 (Cujaba, Matto Grosso, Brazil), one of the specimens cited by Weddell. I did not see Casaretto's sheet myself, but the Surinam plants are identical with Kegel 1339 in Herb. Göttingen, and moreover agree well with t. 21 in the Fl. Bras. In D.C. Prodr. p. 152 Meisner erroneously referred Kegel's plant to *C. pubescens* L. in the § *Haplostachyae*. Lindau, though citing Kegel 1339 under *C. polystachya* var. *pubescens*, also included Meisner's reference under *C. pubescens* L. *C. mollis*, being the older name, should be used instead of *C. polystachya*.

*Polygonum punctatum* Elliot, Sketch Bot. S. Car. and Georgia I (1816 and 1821) p. 455; — *Persicaria punctata* (Ell.) Small, Fl. SE. U.S. (1903) p. 379; — *Polygonum acre* H.B.K., Nov. Gen. II (1817) p. 179, col. fol. ed. p. 143.

Elliot's name *Polygonum punctatum* was revived by Small in Bull. Torrey Bot. Cl. XIX (1892) p. 354. In the preface to his "Sketch" published in 1821, Elliot says that he reprinted the first number in order to include data from Pursh's *Flora Americae septentrionalis*, which appeared when the first number

and part of the second of Elliot's Sketch had been already printed. Whether this incomplete first edition was actually issued he does not state, but it is not mentioned in Pritzel's *Thesaurus Litt. Bot.* ed. 2 (1872).

The exact date of publication, however, does not influence the validity of *P. punctatum*, as *P. acre* H.B.K. is invalidated by *P. acre* Lamarck, *Flore franç.* III (1778) p. 234, and Krockner's *Pol. punctatum* was only published in 1823 (*Fl. silesiaca*, Suppl. II, p. 57).

*Polygonum antibaemorrhoidale* Mart., *Reise in Brasilien* II (1828) p. 550 and in *Linnaea* V (1830) *Litteratur-Ber.* p. 41, with its two varieties  $\alpha$  *aquatile* and  $\beta$  *riparium* was incorporated by Meisner in *Fl. Bras.* V. 1 (1855) p. 18, t. 5 in *Pol. acre*, while in *D.C. Prodr.* XIV (1857) p. 108 *P. antibaemorrhoidale* Mart., *P. distachyum* Mart. mss., and *P. gracilescens* Mart. mss., together with the reference to *P. acre*  $\alpha$  *aquatile* in the *Fl. Bras.*, are included in *P. acre*  $\beta$  *leptostachyum*, and *P. riparia* Mart. mss. and *P. maritimum* Vell. (?) in *P. acre*  $\epsilon$  *riparium*. Small, in *Mem. Dep. Bot. Columbia Coll.* I (1895) p. 88, includes *P. antibaemorrhoidale*, *P. antibaemorrhoidale* var. *aquatile* and var. *riparium* in *P. punctatum*.

An examination of some of Martius's plants from the Munich Herbarium showed those labelled *P. antibaemorrhoidale* Mart. (from Sebastianopol) and *P. gracilescens* Mart. (from the State of Pará) to belong to *P. punctatum*, whereas *P. antibaemorrhoidale* var. *aquatile* (from Rio, n. 260) and *P. distachyum* Mart. (from Bahia) should be excluded on account of their being glandless. Probably these can better be included in *P. hydropiperoides* Mchx.

Focke 542, which Miquel described as *Pol. macrochaetum* (in *Linnaea* XVIII, 1844, p. 242), and which species Meisner (in *D.C. Prodr.* XIV, 1856, p. 110) supposed to be the same as *P. serrulatum* Lagasca, is a rather typical specimen of *P. punctatum* (*P. acre*), to which it was already referred on p. 160 of Pulle's *Enumeration* (1906).

Extreme forms of *P. punctatum*, with few glands and narrow leaves, approach *P. hydroperoides* Mchx., so e.g. Hostmann and Kappler 489.

According to the wide range of variability the species has been subdivided into several varieties or forms by Meisner and Small.

### GUTTIFERAE.

For a review of the previous conceptions of this family, with historical notes, see Planchon and Triana in *Ann. Sc. nat.* 4e sér. XIII (1860) p. 307—312, and Baillon, *Histoire des Plantes* VI (1877) p. 410. Morphology is discussed by Planchon and Triana l.c. XVI (1862) p. 263—308, and by Engler in *Engl. u. Prantl, Nat. Pflanzenfam.* 2 ed. 21 (1925) p. 156.

The phenomenon of plants changing their sex with age, observed by Pierre in some species of *Garcinia*, may be recommended to the attention of people residing in Guyana, as the same may also occur in the American genera of the family. (cf. Pierre, *Flore forestière de la Cochinchine*, pl. 54).

The preparation of dried parts of many Guttiferae, especially of the flowers of species of *Clusia*, is often seriously impeded by the hardened resin, which sometimes forms black, hard lumps in the flower, enveloping the stamens and staminodes. It was found useful to put the flowers, after being boiled in water for some moments, in xylol for two or three days, and then to be transferred to almost pure alcohol, from which they were taken after 1 or 2 days for a final boiling in water.

*Calophyllum brasiliense* Camb. in *Aug. St. Hil., Fl. Bras. merid.* I (1825) p. 321, t. 67, sensu Vesque in *D.C. Mon.* VIII (1893) p. 590.

*C. brasiliense* Camb., originally described from Espiritu Santo, Brazil (type-specimen *St. Hilaire B. II. 2. 330 [P]*), has been enlarged by Vesque to a collective species subdivided into

ssp. *verum* (= *C. brasiliense* Camb.), Brazil, again subdivided into 5 varieties, ssp. *longifolium* (= *C. longifolium* Willd.), Peru, Panama, Jamaica, ssp. *Mariae* (= *C. Mariae* Planch. et Triana), Colombia, and ssp. *Wrightii* (= the plant determined as *C. Calaba* by Grisebach, Pl. Wrightianae).

In his recent paper in *Tropical Woods* n. 30 (1932) p. 6 Standley still more enlarges *C. brasiliense* by attaching to it, as var. *Rekoi*, ranging from Mexico to Panama, *C. Rekoi* Standl. and *C. chiapense* Standl., and as var. *antillanum* *C. antillanum* Britton (= *C. Calaba* Jacq. = *C. Jacquinii* Fawc. et Rendle) from the West Indian Islands. No mention is made of the anatomical structure of the leaves, which, according to Vesque, should afford the principal differences between *C. Calaba* Jacq., *C. brasiliense* Camb. and *C. lucidum* Benth.

The Surinam plants have all a well-marked hypodermis, and the midrib canaliculately impressed in the basal half of the upper surface. The leaves are rather variable, even those from the same tree. B.W. 6739, with larger flowers and broad leaves, resembles *C. lucidum* Benth. in general appearance, but its leaves, though shiny, have not the lacquered surface of the type-specimen of the latter (Schomburgk 514, Br. Guyana [K]), nor does the anatomical structure of the leaves justify its separation.

As the Old-World species of *Calophyllum* number about 90, those studying the Indian species will be better qualified than the present writer to give their opinion on the few American ones.

***Calophyllum longifolium*** Willd. in *Mag. Ges. naturf. Freunde* 80 (1811); H.B.K., *Nov. Gen.* V (1821) p. 202, col. fol. ed. p. 156; Planch. and Triana in *Ann. Sc. nat.* 4e sér. XV (1861) p. 255; — *C. brasiliense* Camb. ssp. *longifolium* (Willd.) Vesque in *D.C. Mon.* VIII (1893) p. 592.

Known in a sterile state only. B.W. 1938 fairly agrees with Bonpland's specimen from Peru [P] but the structure of its

mesophyll shows a horizontal tendency not mentioned by Vesque. A similar specimen, Burchell 7462, probably from Brazil, is in the Herbarium at Kew.

**Caraipa** Aubl., pro parte, emend. Benth. et Hook.

The genus was founded by Aublet in 1775 on very incomplete material, only one out of his four species being described and figured with fruit, the other being sterile (Aublet, *Hist. des Plantes de la Guiane française* I, p. 561, IV, t. 223, 224).

A critical enumeration of the species was given by Choisy in *Mém. Soc. Phys. et d'Hist. nat. de Genève* XIV, 1858, p. 163, and by Bentham in *Journ. of Proc. of the Linn. Soc., Botany*, V, 1861, p. 61. In 1886 Wawra's monographical account of the *Caraipas* in the *Flora Brasiliensis* was published. A review by Ducke, with descriptions and a key of the species of *Caraipa* found in the State of Pará, appeared in *Arch. do Jard. Bot. do Rio de Janeiro* III, 1922, p. 214, and some later notes in the same periodical.

In Bentham's paper mentioned above, and further in Bentham and Hooker's *Genera Plantarum* I, 1862, p. 188, attention was drawn to the composite character of Aublet's genus *Caraipa*, the stipulate plants having probably to be referred to the genus *Licania*, and only the fruit figured by Aublet on t. 223, fig. 3 and 4, the description of which he included in his generic diagnosis, certainly belonging to a species of what is now generally called *Caraipa*. Perhaps by some error Aublet assigned this fruit to *C. parvifolia*, and in fig. 2 drew a similar fruit attached to the branch of *C. parvifolia*, a species described by him as having stipules, and whose bark he says is used by the Garipons in the manufacture of pottery. This, together with the vernacular name Caraipé, points to *Licania*, as was shown by Bentham and Spruce (cf. Spruce, *Notes of a botanist on the Amazon*

and Andes, edited by A. R. Wallace, 1908, I, p. 10—14).

I did not find any separate fruits of *Caraipa* among the collections in the British Museum, and Aublet's specimens are all sterile, so the type-species cannot be indicated with any certainty. None of the sterile specimens could be identified with Surinam species.

Since Bentham's first paper contains some contradictory statements, it seems preferable to consider the genus emended by Bentham and Hooker in 1862.

The specimens from Richard's herbarium described by Cambesès are probably lost, as they are neither at Paris nor in the Herbar de la Conservatoire at Geneva.

*Caraipa densifolia* Mart., Nov. Gen. et Sp. I (1824) p. 105, t. 65 f. 6—11 (fr.); — *C. fasciculata* Camb. in Mém. du Muséum XVI (1828) p. 416; — *C. excelsa* Ducke in Arch. do Jard. Bot. do Rio de Janeiro III (1922) p. 219.

The Surinam specimens are quite identical with a fruiting sheet in the Munich Herbarium collected by Martius and inscribed "*C. densifolia* Mart.?" and "*C. fasciculata* Camb. fide Wawra" (on the same label) but for the slightly sharper apex of their fruits.

Both Spruce's specimens generally interpreted as *C. fasciculata* (I did not see Cambesès's type-specimen collected by Richard in Fr. Guyana) and part of Ducke's specimens of *C. excelsa* (several specimens determined by Ducke in the Utrecht and other Herbaria, duplicates of two of the type-specimens, Hb. Mus. Paraense n. 16382 and n. 16424 in the Paris Museum) have somewhat smaller fruits and rather richly branched inflorescences, while other Ducke specimens (e.g. Hb. Rio n. 12495 [U]) approach the Surinam and Martius plants. The variability of his *C. excelsa* should, as stated by Ducke l.c. p. 220, perhaps be partly ascribed to environmental influences.

***Caraipa punctulata*** Ducke in Arch. Jard. bot. Rio de Janeiro, III (1922) p. 216.

Capsula usque 22 mm longa, plus minusve asymmetrica, ovoideo-trigona, apice sensim acuminata, faciebus lateralibus usque 14 mm latis, glabra, endocarpio non solubili.

Specimina fructifera:

Guiana batava, Brownsberg, arbor n. 1042 (B.W. n. 5061, cum fructibus maturis lectus mense Mart. 1921 [U]; ejusdem arboris B.W. n. 3652 lectus Mart. 1918 et n. 4262 lectus Febr. 1919).

***Caraipa Richardiana*** Camb. in Mém. du Muséum XVI (1828) p. 414, t. 18.

The type-specimen, collected in French Guyana by Richard, is probably lost, but another specimen (in the Paris Museum), collected by Martin (fl., fr.), and bearing a determination in Cambessèdes's handwriting, seems to confirm the current interpretation as given by Bentham, Wawra, and others.

An exception should be made for *Caraipa latifolia* Aublet, which Wawra considered identical with *C. Richardiana*, the specimen in the British Museum being very different and easily distinguished by the conspicuously pruinose undersurface of its leaves.

*C. Richardiana* seems to pass gradually into *C. psidiifolia* Ducke. I did not see the type-specimens of the latter (Hb. Rio n. 4762 and n. 1899), but there are two sheets determined by Ducke in the Utrecht Herbarium (Hb. Rio n. 18029 fl., fr., and n. 18030, fl.) which have the same flat nervation on the upper surface of their leaves, and the same flowers and kind of fruit as the Martin plant. The dimensions of the leaves form no good distinguishing characteristic (*C. Richardiana* according to Cambessèdes  $7\frac{1}{2}$ —15 cm l., the Martin plant 15— $17\frac{1}{2}$  cm l., Hb. Rio n. 18030 to 11 cm l., n. 18029 18— $21\frac{1}{2}$  cm l.), while the leaves of Martin's plant are punctulate with transparent

spots just as those of *C. psidiifolia*; the leaves of Ducke's species however are broader in their basal part.

Kappler 1914 ed. Hohenacker, from Surinam [U] agrees with the Martin sheet at Paris, but has a slightly more prominent nervation on the upper side of the leaves. This is still more the case with B.W. 3440.

The scarcity of sufficient material does not allow any definite opinion to be expressed on these species.

Sagot (in Ann. Sc. nat., 6e sér. XI, 1880, p. 159) suggested that different species might have been confused under the name *C. Richardiana*.

### *Clusia* L.

For particulars about the type-species of the genus see Planchon and Triana in Ann. Sc. nat. 4e sér. XIII (1860) p. 334.

The nomenclature of the bracts and lower flower-parts may not appear quite satisfactory and not always easily applicable, but the present solution seems the most suitable.

The term bracteoles is used for those single pairs of bracts, placed at the upper end of the ultimate more or less grown-out ramifications supporting a single flower. As a rule they are quite bract-like in form, those of the lateral branches only differing from the lower bracts in their slightly smaller size. In several species (not in all!) there is a visible internode between these bracteoles and the "flower" resp. the calycular bracteoles. A minute axillar bud is generally present.

The term calycular bracteoles denotes those flower-parts of probably bracteolar origin inserted immediately below the flower, without visible internode, and intermediate in form and dimensions between the true bracts and bracteoles and the sepals. In several species they fall together with the flower or fruit.

In the schematical figures all bracts and bracteoles are

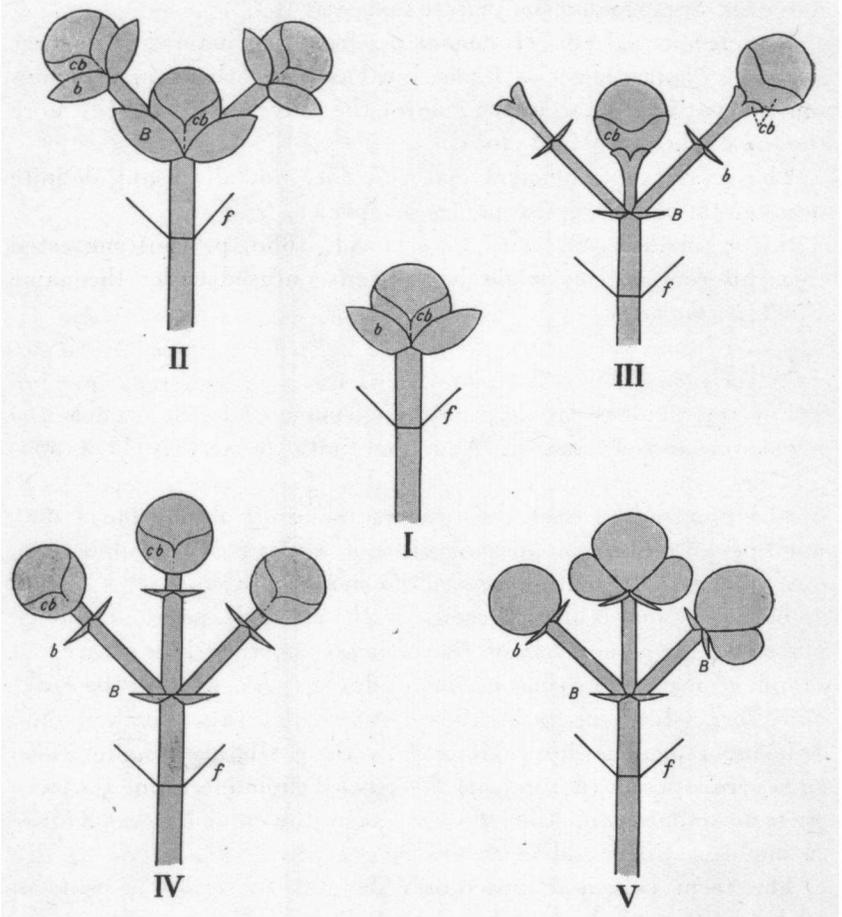


FIG. 2. **Clusia**. Schematic drawing of some types of inflorescences.  
*f* leaves, *B* bracts, *b* bracteoles, *cb* calycular bracteoles.

I and II ***Cl. platystigma*** Eyma

III ***Cl. palmicida*** L. C. Rich. ap.  
 Pl. et Tr.

IV ***Cl. grandiflora*** Splitg.

V ***Cl. robusta*** Eyma

drawn as if top and base of all of them were lying in one plane. In reality they are decussately inserted and accordingly those of branchlets of the same rank are parallel.

A few quotations may illustrate the different views on the nature of the calycular bracteoles.

Planchon and Triana in *Ann. Sc. nat.* 4e sér. XIII (1860) describe p. 326 *Cl. palmicida* with "bracteis calycinis 2—4, sepalis 4", and p. 334 *Cl. minor* L. with "bracteae calycinae 2; calyx 4-phyllus, foliis biseriatis; sepala 4, decussata, rarius 5". In vol. XVI (1862) p. 274 they speak of "des bractées calycinales, . . . pouvant à la rigueur être regardées comme virtuellement pourvue d'un bourgeon axillaire . . .", whereas p. 275 they seem inclined to call them bractéoles when every trace of an axillary bud is lacking, adding at the same time, however, that this distinction will not suffice either. On the same page they express their doubt as to the possibility of giving some valid distinction between bracteoles and calyx: "Ici encore passage, nuance, danger de vouloir trop bien distinguer ce que la nature n'a pas fait distinct".

Bentham and Hooker, *Genera plantarum* I. 1. (1862) p. 170: *Clusia*: "bracteae sub calyce 2 v. rarius  $\infty$  per paria decussatae".

Eichler, *Blüthendiagramme* II (1878) p. 253: *Clusia*: "Bei dem Umstand, dass die involukrirenden Hochblättchen in Form und Grösse ziemlich allmählich in die Kelchblätter überzugehen pflegen, könnte man geneigt sein, sie ebenfalls noch zum Kelche zu rechnen. Indess ist es wohl richtiger, nur die 4 oder 5 der Krone unmittelbar vorausgehenden dafür in Anspruch zu nehmen, da diese immer vorhanden sind, während die Involukralblättchen fehlen können".

Vesque, in *D.C. Mon.* VIII (1893) p. 18: *Clusia*: "sepala 4—5, v. additis bracteis sepaloideis, multiplicata", p. 27: "sepala 4—5 v. bracteis calycinis additis multiplicata".

Fawcett and Rendle, *Flora of Jamaica* V. III. (1926) p. 191:

*Clusia*: "bracteoles 2—14, decussate in pairs, sepal-like, but smaller".

Engler, in Engl. u. Prantl, Nat. Pflanzenfamilien, 2 ed., 21 (1925) p. 159: *Guttiferae*: "... um einen Anhaltspunkt zu gewinnen, sehe ich alle unterhalb der Pet. stehenden hochblattartigen Gebilde, zwischen denen die Internodien nicht mehr gestreckt sind, als zum Kelch gehörig an".

*Clusia flaviflora* Engler in Engl. Bot. Jahrb. LVIII (1923) Beibl. 130, p. 3.

The type-specimens from Peru (Weberbauer 1128, ♂, and 1119, ♀, seen [D]) have broader leaves, more robust inflorescences, and larger flowerparts than the Surinam ones.

This species belongs to a very coherent group of plants, mostly known from the north-western part of the South American Continent and from the West Indian Islands. Indeed it is not impossible in my opinion that in the future some of these will prove variations of one widely distributed species. In this respect *Cl. Krugiana* Urb. from Porto Rico (type-specimens: Sintenis 1380, fr. [D] and 6565, fr. [duplic. P]) and *Cl. multiflora* H.B.K. from Colombia (type-specimen: Bonpland [P]) at least seem to be more closely related to *Cl. flaviflora*. The former differs in its larger number of seeds (6—9 in each cell), which may, however, be of minor importance as a note with *Cl. flaviflora* in the Berlin Herbarium seems to testify, the latter in the more lateral insertion of its stigmas, the number of ovules (4—5 in each cell) and the less vaginate petioles. In connection with possible relations as here suggested the fact that the two Surinam specimens were collected in the Emmarange on top II at 700 m alt. and on the Hendriktop at 1080 m alt. may be more than incidental, there being indications which point to western elements (Roraima and other) in the flora of this region.

*Clusia grandiflora* Splitgerber in Tijdschrift v. Nat. Gesch. IX (1842) p. 101. — Fig. 3 (p. 19).

The Leyden Herbarium contains two sheets of *Cl. grandiflora* collected by Splitgerber near Blaauwe berg, Surinam.

One of these (Splitgerber n. 207, H.L.B. 903, 343—297), bearing several notes by Splitgerber himself, and accordingly to be considered the type, is in a rather poor state, the specimen consisting of a leaf-bearing branch terminated by the remains of an inflorescence (peduncle with 2 bracts). The other sheet (Splitgerber s.n., H.L.B. 903, 343—298) bears two separate male flowers, and an envelope containing parts of other flowers and some flower-buds. The flowers of *Cl. grandiflora* were described by Splitgerber as hermaphrodite, but, those at Leyden being male, Splitgerber probably mistook the central staminodial mass for the ovary. The more recent collections being male, the structure of the female flower remains unknown.

The specimen figured in Miquel's *Stirpes Surinamenses selectae* (1850) t. 25 could not be traced, perhaps the plate is a combination of some specimens at Leyden and Utrecht. The figures of the fruits and flowers on t. 26 were obviously drawn after the dry objects contained in a glass jar in the Utrecht Herbarium, and may be the same as described by Splitgerber, since fruits of this kind are lacking at Leyden. In the description of this plate the parietal laminal callosities are erroneously referred to as the placentae.

As noted by Planchon and Triana, Miquel also mistook the central staminodial mass of the male flowers for an ovary.

Specimens of what is now described as *Cl. platystigma* n. sp. have generally been determined as *Cl. grandiflora* (cf. p. 25).

Bentham's opinion that *Cl. grandiflora* Splitg. might be a synonym for *Cl. insignis* Mart., based on Schomburgk 100 and Hostmann 572 (in Hook. Lond. Journ. Bot. II, 1843, p. 368) and taken over by Miquel in his account of Focke's collections

(in *Linnaea* XVIII, 1844; p. 235), was rejected by Splitgerber himself in a note on one of the labels of the type-specimen, and also by Miquel in 1850 (*Stirpes Sur. sel.*, p. 90).

Hostmann 572 [U, K, NH, P] is really *Cl. grandiflora* Splitg., but Schomburgk 100 [K] certainly not, though I cannot say whether it belongs to *Cl. insignis* Mart.

It may be that even a third, or still more! species exist which have hitherto been considered *Cl. grandiflora* but will perhaps prove distinct, so for example Schomburgk 51 [D], inscribed *Cl. petiolata* Klotzsch, and Herb. Rio n. 21259 collected by Ducke in the state of Pará [U].

*Clusia pana-panari* (Aubl.) Choisy in D.C. Prodr. I (1824) p. 559; Vesque in D.C. Mon. VIII (1893) p. 114; — *Quapoya Pana-panari* Aublet, Hist. Pl. Guiane fr. (1775) II, p. 900, IV, pl. 344; Planch. and Triana in Ann. Sc. nat., 4e sér. XIV (1860) p. 236; — *Clusia quapoya* auctt., Sagot in Ann. Sc. nat., 6e sér. XI (1880) p. 165.

This species, in its present large conception, contains plants of a very varying general habit, due to differences in the dimensions and texture of the leaves as well as in the prominence of the nervation.

A sheet in the British Museum inscribed "*Clusia Quapoya panapanari* Aublet!", but without Aublet's original label, bears parts belonging to at least two different plants, separated by a pencilled line, the upper group showing a bare orange branchlet with black nodes, some detached, small obovate-cuneate leaves  $\pm 5 \frac{1}{4}$  cm l. without visible nervation, part of an inflorescence with flower-buds, like those of the Surinam plants, and parts of seeds, while the lower, inscribed "this is *Clusia alba* Aublet", contains a branch bearing two larger leaves on petioles 15—17 mm l., the blade  $\pm 7$  cm l., broadest about the middle and narrowing towards both ends, the apex itself rounded, and with a well-defined nervation, two detached leaves like the others, and a detached inflorescence  $\pm 4 \frac{1}{2}$  cm l., without

flowers, or flower-buds, more robust and blackish. The former is obviously Aublet's *Quapoya Pana-panari*.

The interpretation of both Aublet's genus *Quapoya* and his analytical drawings have been discussed by Planchon and Triana, Vesque and Sagot, which see.

The species was already enlarged by Vesque so as to include specimens with somewhat larger and more distinctly nerved leaves. The material from Surinam now available, among which are plants with large, pedicelled, strongly nerved leaves, necessitates *Cl. pana-panari* to be treated as a polymorphous species, since it is well-nigh impossible to draw any well-defined limit between the different types. In this respect the present idea is supported by the evidence supplied for instance by the leaves of Hostmann 259 [K], where, on the same branch the apical ones are thin and well nerved, whereas in the lower ones the nervation is almost invisible above.

Pulle 249, 264 and 265, all collected at Voltzberg, have rather large and thin, membranaceous to chartaceous, conspicuously nerved, obovate-cuneate leaves, to 10 cm l. The first, the only female specimen hitherto reported from Surinam, has flowers corresponding with Sagot's description, whereas the other two have flowers showing a tendency towards hermaphroditism, having 5 well-developed stigmas on a sterile solid column, divided into 5 styles in its upper part, and surrounded by 2 rows of 5 stamens. Separate transversely ribbed fruits, agreeing with those described by several authors, were collected both with 249 and 265, but those with 265 may have been erroneously included in that number.

*Cl. pana-panari* is often epiphytic on other trees; those from Voltzberg, where they are said to be the common *Clusia*, were growing on the rocks, Pulle 249 with long creeping roots. In view of the wide range of variability of *Cl. pana-panari*, the specific value of several related species is to be doubted. Sterile specimens with nerved leaves may be easily confounded

with *Cl. parvicapsula* Vesque, now also reported from Surinam, from which they can only safely be distinguished when flowers or fruits are available.

***Clusia parvicapsula*** Vesque, Epharmosis III (1892) t. 34, and in D.C. Mon. VIII (1893) p. 98.

The plant collected by Versteeg on the slope of Mt. Teboe corresponds with Bourgeau's specimen from Mexico in the Paris Herbarium. The other specimens mentioned by Vesque are from Colombia and Peru. Judging from the description and photograph in Contr. U.S. Nat. Herb. XXIV (1922) p. 14 *Cl. utilis* Blake from Guatemala scarcely differs from *Cl. parvicapsula*. The differences mentioned by Blake being in my opinion not very important, *Cl. utilis* will probably prove to be the same as *Cl. parvicapsula*.

***Clusia platystigma*** Eyma, n. sp. — Fig. 3 (p. 19).

Frutex vel arbuscula epiphytica, ramulis teretibus. Foliorum petioli usque 6 mm longi, basi in vaginam latem submarginato-excavatam abrupte ampliati, laminae obovato-cuneatae, apice rotundatae, rarius obtusae, a triente superiore basin versus sensim cuneatim angustatae, circ. 24 cm longae, carnosae, statu sicco subtus ochraceae, nervo mediano supra prominente, subtus valde expresso, nervis primariis creberrimis, subrectis, oblique parallelis, nervo marginali connexis, supra planis vel subprominulis, subtus prominulis. Inflorescentiae terminales, nutantes, saepius 1-florae, sed nonnunquam (e.g. in B.W. n. 3987) e bracteolis magnis subfloralibus ramosae 3-florae; pedicellus circ. 3—4 cm longus, in inflorescentiis ramosis circ. 1 ½ cm longus; bracteolae (vel bracteae in inflorescentiis 3-floris) florem valde approximatae, magnae, latae, suborbiculari-naviculares, apice saepius fissae, 2—2 ½ cm longae, bracteolae florum lateralium minores, circ. 1 ½ cm longae; bracteolae

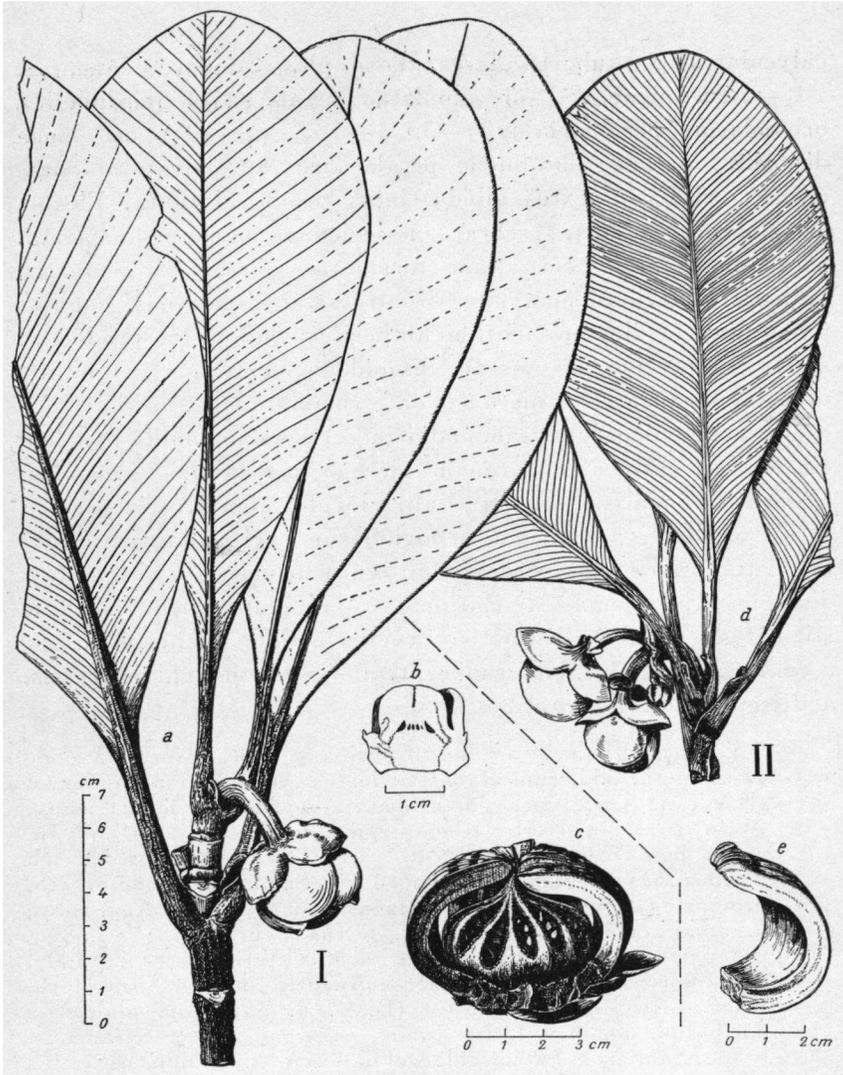


FIG. 3.

I *Clusia platystigma* Eyma  
 a habit (B.W. 357); b ovary and  
 staminodial ring cut lengthwise (B.W.  
 415); c fruit (B.W. 415).

II *Clusia grandiflora* Splitg.  
 d habit (B.W. 3849); e portion of  
 fruit (Splitgerber?).

calyculares 2, suborbiculares, basi plus minusve connatae, 1 ½—2 cm longae, 2 ½—3 ½ cm latae; sepala 4 (vel interdum 6?), orbicularia, per paria 2 ½—3, 3—3 ½, (4—4 ½) cm longa disposita, pallide albo-lutea; petala circ. 8, obovato-oblonga, circ. 7 cm longa, extus albida, intus rosea vel rubra. Florum masculorum stamina crebra, in seriebus plurimis disposita, coronam usque 2 cm altam formantia, filamentis connatis, antheris linearibus rima laterali-introrsa dehiscentibus, connectivis ultra loculos in aristam antheris aequilongam productis; staminodia crebra in massam discoideam centralem resinosa, vivo luteam, siccitate nigram, conferruminata.

Florum femineorum staminodia in seriebus nonnullis ovarium cingentibus disposita, coronam circ. 8 mm altam formantia, filamentis connatis, connectivis ultra loculos abortivos in acumen breve productis; ovarium semiglobosum vel oblongum, subtruncatum, parietibus percrassis, 13—14-loculare, ovulis crebris dissepimentis insertis, stigmatibus 13—14 planis, non nisi facie stigmata a valvis distinctis. Fructus ovoideo-globosus, usque 6 cm longus, albidus, basi rudimentis floris cinctus, valvis crassis, a dissepimentis separantibus.

Guiana batava, ad flumen Suriname superius prope Goddo (Tresling n. 333, cum alabastris lectus Aug. 1908); Zandery I (B.W. n. 415, typus floris feminei et fructus, lectus mense Majo 1915, in Herb. Rheno-trajectino [Utrecht]; B.W. n. 4078, cum fruct. lectus Nov. 1918; Samuels n. 265, cum floribus masc. lectus Julio [K, L, P]; Sectie O, arbor n. 728, pro parte (B.W. n. 3109, cum alabastris masc. lectus Aug. 1907; n. 3656, cum alabastris masc. lectus Febr. 1918; n. 3849, pro parte, cum alabastris masc. lectus Majo 1918; n. 3987, typus floris masculi, lectus mense Augusto anni 1918, in Herb. Rheno-trajectino); Sectie O (B.W. n. 357, cum alabastris floribusque femineis lectus Junio 1914); ad flumen Saramacca prope Santigrion (Wulfschlaegel n. 1379, cum floribus lectus [B]); loco ignoto (Wulfschlaegel s.n., ster. [B]; Hb. Dep. v. Landbouw n. 179, fructus. [U]).

Guiana gallica (Martin s.n. [B, NH]); ad fl. Acarouany (Sagot n. 789, cum floribus masc. lectus anno 1856 [U, B, K, NH, P excl. fruct.]).

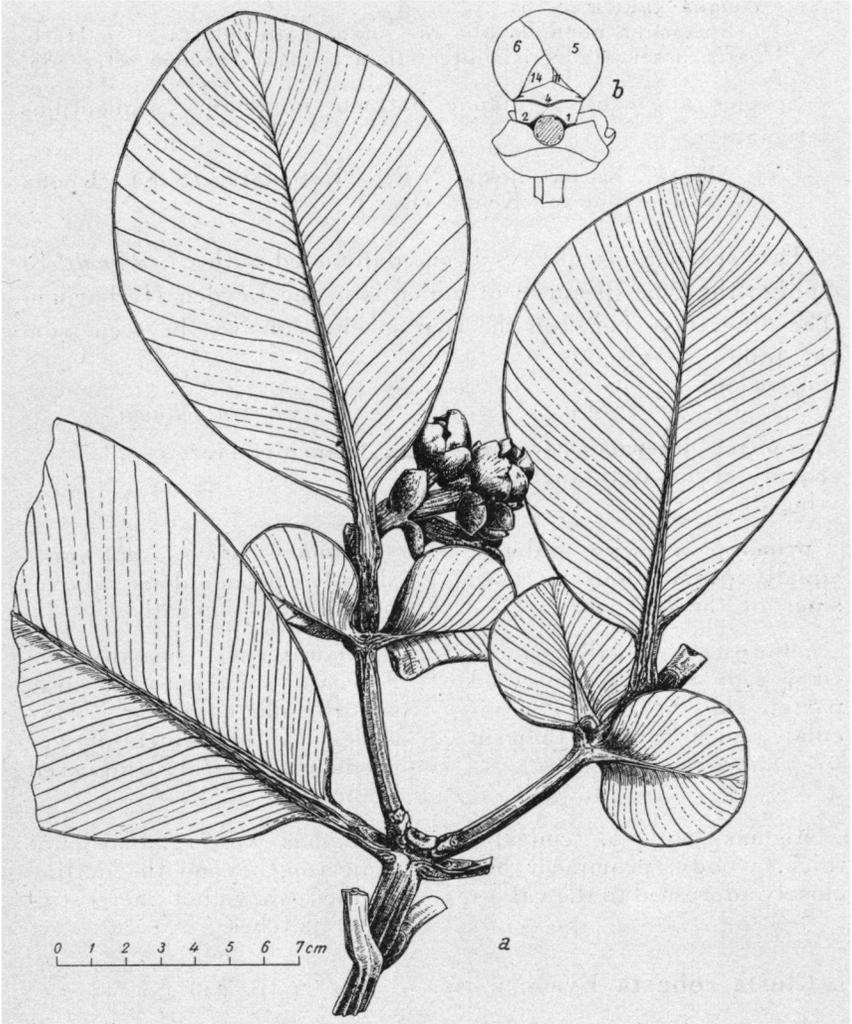


FIG. 4. *Clusia robusta* Eyma  
B.W. 5728: a habit; b central flower-bud (sepals partly removed).

Fructus "ancienne collection, F 1793" [P] verisimiliter in Guiana gallica lectus.

Specimina nonnulla alia in Guiana gallica lecta et in Herb. paris. asservata verisimiliter etiam ad hanc speciem referenda.

Species ab incolis Guianae batavae nominibus sequentibus designata:

Abrasa, Koemoedjoko (N.E.); Katoetatai (Sar.); Koeffa (Ar.); Joeva-joeva, Koöpó (Kar.).

This species has always been confounded with *Cl. grandiflora* Splitg., the type-specimen of which is in the Leyden Herbarium. The differences between the two species can best be seen from the following key:

*Cl. grandiflora*

younger internodes rather sharply decussately angled or winged

primary nerves almost equally prominulous on both sides of the leaf

inflorescence usually branched in 2 or 3 equal 1-flowered parts; the bracteoles navicular, much smaller than in *Cl. platystigma*

stigmas 10—15, cuneate, thick, woody, prominent but closely adpressed to the valves

*Cl. platystigma*

branchlets terete

primary nerves flat or slightly prominulous above, prominulous beneath

inflorescence usually 1-flowered, sometimes the large suborbicular-navicular bracteoles of the central flower producing lateral 1-flowered branchlets

stigmas 13—14, flat, not projecting beyond the outline of the ovary, but mere stigmatic patches

*Clusia robusta* Eyma, n. sp. — Fig. 4 (p. 21).

Arbor, vel frutex magnus, usque 10 m alta, radicibus aereis munita, ramulis crassis robustis 4- vel 6-angularibus. Folia valde variabilia in eodem ramulo, lamina nunc obovata magna,

13—19 cm longa, petiolo usque 4 cm longo munito, nunc orbicularis parva, 4—6 cm longa, petiolo  $\frac{1}{4}$ — $\frac{1}{2}$  cm longo munito, apice et basi plus minusve rotundata vel in foliis majoribus nonnihil in petiolum contracta, petiolis crassis, robustis, marginatis, foveola vaginali non marginata, nervo mediano utrinque equaliter prominente, nervis primariis crebris, subrectis, prominulis, cum minoribus alternantibus. Inflorescentiae (non nisi immaturae alabastra mascula gerentes visae) terminales, semel vel bis tripartitae, 3—9-florae; pedunculus circ. 2  $\frac{1}{2}$  cm longus; pedicelli usque 1  $\frac{1}{2}$  cm longi; bractee ovato-naviculares, concavae, 1—1  $\frac{1}{2}$  cm longae; alabastra mascula orbicularia, maxima visa 2 cm diametentia; axis floralis cylindricus; sepala 6, decussata, imbricata, orbicularia; petala 8, aestivatione irregulare; stamina creberrima, in seriebus plurimis annulariter dispositis, massam staminodiorum cingentes, filamentis brevibus in anulum crassum connatis, antheris linearibus rimis longitudinali-introrsis dehiscentibus, connectivis non ultra thecis productis; staminodia crebra linearia obtusa. Flores feminei et fructus ignoti.

Guiana batava, in monte Hendriktop, alt. 1080 m (B.W. n. 5728, typus, cum alabastris masculis lectus mense Martio anni 1922, in Herb. Rheno-trajectino [Utrecht]).

The Surinam plant resembles *Cl. angularis* Le Maout et Decaisne in several respects, but as this species has not been described but only illustrated by Le Maout and Decaisne in their *Traité général de botanique* (1868) p. 335 without even indicating its origin, and there seem to exist no herbarium specimens, it was deemed safer not to apply this name to the plant from Surinam. *Cl. angularis* has been neglected by Vesque, the *Index Kewensis*, and by Engler. *Cl. alata* Planch. et Triana (type-specimen: Triana s.n., Colombia [P]) differs in having sessile upper leaves, while the bracts below its lower flowers attain 3 cm, against 1  $\frac{1}{4}$  cm below the lower flower-buds of *Cl. robusta*.

**Clusia scrobiculata** R. Benoist in Bull. Mus. Hist. nat. Paris XXX (1924) p. 511.

This species has been described with female flowers and young fruits only (Benoist 136, fl., Mélinon 205 and 224, fr., all from French Guyana [P]). The Surinam specimen now at hand has flowers in an advanced stage showing already developing fruits and the same ring of 10 connate clavate "staminodes" as the specimens at Paris possess, the apical cups empty or only filled with a black hardened resin. An analysis of two flower-buds from the same sheet, however, showed these cups already open and filled with pollen, but without any partitions.

**Moronobea coccinea** Aubl., Hist. Pl. Guiane fr. (1775) II, p. 789, IV, t. 313, pro parte, excl. fig. a—j.

var. *attenuata* Eyma n. var.

A specie differt foliis subtus argenteis, alabastris floralibus magis elongatis acutioribusque, petalis albo-luteis margine roseis.

Guiana batava, ad fl. Tapanahony prope Kloemansingi (B.W. n. 4178, typus, cum alabastris floribusque lectus mense Novembri anni 1918, in Herb. Rheno-trajectino [Utrecht]).

### **Rhedia** L.

For particulars about the type-species of the genus see Planchon and Triana in Ann. Sc. nat. 4e sér. XIV (1860) p. 308 and p. 317, Grisebach, ibid. XV (1861) p. 231, and Planchon and Triana, ibid. XV p. 236.

**Rhedia Benthamiana** Pl. et Tr. in Ann. Sc. nat. 4e sér. XIV (1860) p. 320; — *Rb. macrophylla* auctt., Engler in Fl. Bras. XII, 1 (1888) p. 460, pro parte; — *Rb. macrophylla* var. *Benthamiana* (Pl. et Tr.) Vesque in D.C. Mon. VIII (1893) p. 500. — Figs. 5 and 6 (pp 27 and 28).

*Rb. Benthamiana* was described with Schomburgk 523 und 990, both from British Guyana. Planchon and Triana cite as

synonyms: *Garcinia macrophylla*? Benth. in Hook. Lond. Journ. Bot. II, 1843, p. 369 and *Garcinia macrophylla*, Choisy, Guttif. de l'Inde, p. 37 (certe ex specimine authentico minime ex diagnosi pessima) non Mart. The plant determined by Bentham as *Garc. macrophylla* Mart.? and accordingly the type of *Rb. Benthamiana*, was Schomburgk 523. Choisy in his paper (published in Mém. Soc. de Phys. et d'Hist. nat. de Genève XII, 1849) refers to Bentham, he himself having examined sheets of Schomburgk 523 at Paris and in Herb. Boissier.

Of the three sheets in the Paris Herbarium the one from herb. Pierre is identical with 990, but the two others appear slightly different, that from Splitgerber's herbarium having leaves only 12 cm l. and 5 ½ cm broad, with a rather dense reticulation, the other sheet, bearing the label "Schomburgk 523, 1868, no. 33, Guian. angl." approaches no. 990 as to its nervation, but the colour of its leaves is more like that of *Rb. macrophylla*, though none of the specimens mentioned may be identified with the latter species. The sheets of Schomburgk 523 at Kew and in the Br. Museum agree with the Paris sheet last mentioned, those of Schomburgk 990 (1702 R) at Kew are identical with those bearing the same number at Paris. The differences between the Schomburgk numbers however are too slight to separate them, though a conclusive opinion can only be formed when ripe fruits are available. The Surinam plants are similar to Schomburgk 990.

Engler, in Fl. Bras., again incorporated *Rb. Benthamiana* in *Rb. macrophylla*, while Vesque preferred to keep it, at least provisionally, as a distinct variety.

The fruits, warty in the specimens from Surinam and Br. Guyana (not echinate as in *Rb. Kappleri*), together with the different nervation and smaller flowers readily distinguish *Rb. Benthamiana* from *Rb. macrophylla*.

*Rheedia Sagotiana* Engl., which Engler placed in the section *Eurheedia*, notwithstanding its fruit being unknown, was referred

by Vesque as a synonym to *Rb. macrophylla*, but a sheet of Sagot 1182 at Brussels determined by Engler himself, and some bearing the same number at Paris (except one really belonging to *Rb. macrophylla*), Kew and the Br. Museum are not that species but *Rb. Benthamiana*.

The plants collected in Br. Guyana by Sandwith, who considered them a long-leaved form of *Rb. floribunda* (in Kew Bull. 1931, n. 4, p. 177), cannot be distinguished from Schomburgk 990, which differs from the plants formerly called *Rb. floribunda* in the nervation of its leaves. Mr. Sandwith told me that the fruits of his plants, in shape and dimensions as those from Surinam, were edible when collected, and so perhaps nearly ripe.

The specimens examined of *Rb. longifolia* Pl. et Tr. (the type, Spruce 2441 from the Rio Uaupes, in Paris, duplicates in Brussels and Kew) and its var. *subcordata* Vesque (type: Triana s.n., from Medellin, Colombia, at Paris) resemble *Rb. Benthamiana* in general appearance, the chief difference being in the leaves more gradually tapering towards the apex, with less curved primary nerves. Fruits being unknown its relations remain obscure. Engler, in Fl. Bras., presumably by error, placed the species in the section *Eurhœdia* with smooth fruits.

***Rhœdia Kappleri* Eyma, n. sp. — Fig. 5 (p. 27).**

Descriptio speciminis Kappler 593a, in Herb. Rheno-trajectino [Utrecht], speciei typi, flores masculos gerentis: Arbor (?), ramulis rectis, juventute applanatis, acute carinatis, statu sicco viridibus. Foliorum petioli circ. 8 mm longi, in ramulos decurrentes carinas acutas formantes, marginibus inflexis supra conniventibus, minute denseque transversim rugulosi, laminae elliptico-oblongae, longitudine latitudinem 2 ½—3-plo superante, apice recurvatae, siccitate plicatae, subacuminatae, basi subacutae in marginibus petiolaribus inferne abrupte conniventibus contractae, circ. 12—14 cm longae, 4—6 cm latae, chartaceae vel subcoriaceae, statu sicco utrinque virides, opacae, subtus

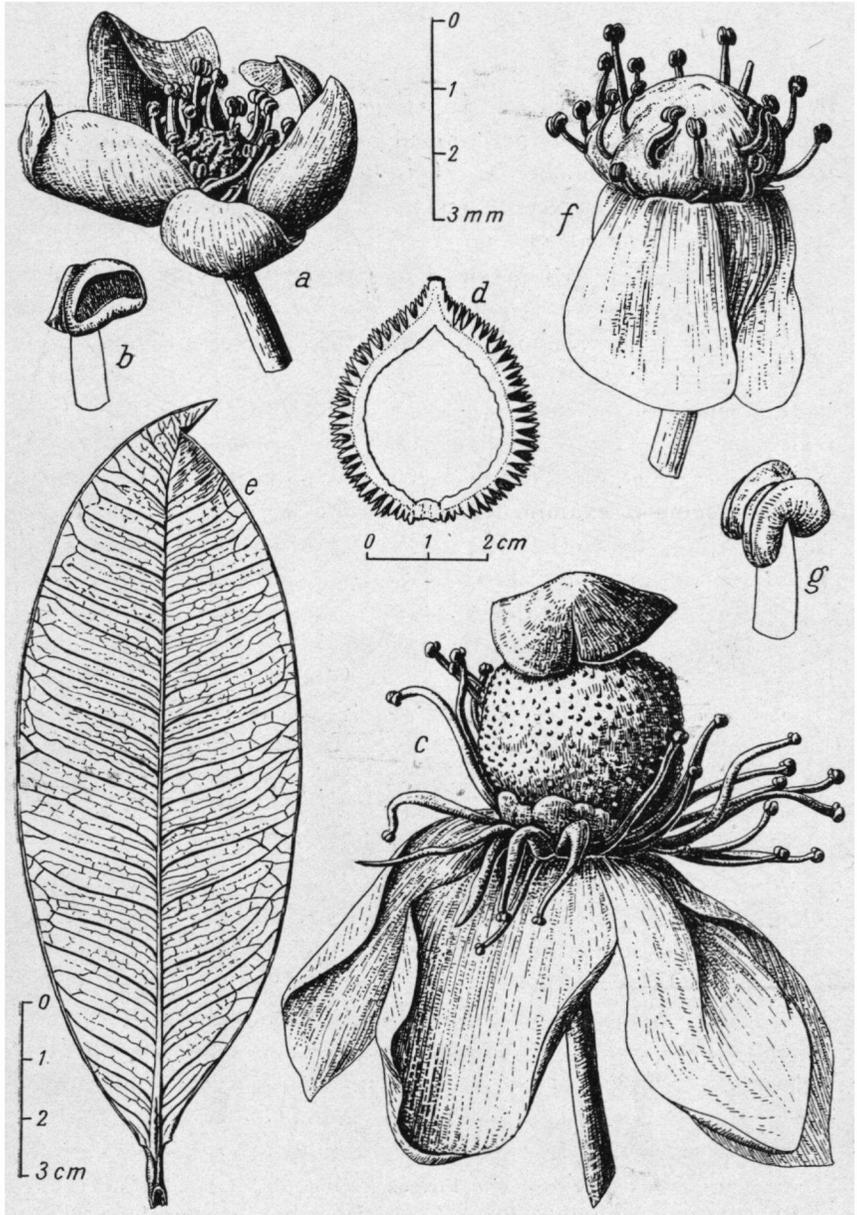


FIG. 5. *Rheedia Kappleri* Eyma. a ♂ flower-bud (Kappler 593 a); b anther of a; c ♀ flower (B.W. 1618); d fruit (B.W. 1818); e leaf (Kappler 593 a).

*Rheedia Benthamiana* Pl. et Tr. f ♂ flower (Pulle 516); g anther of f.

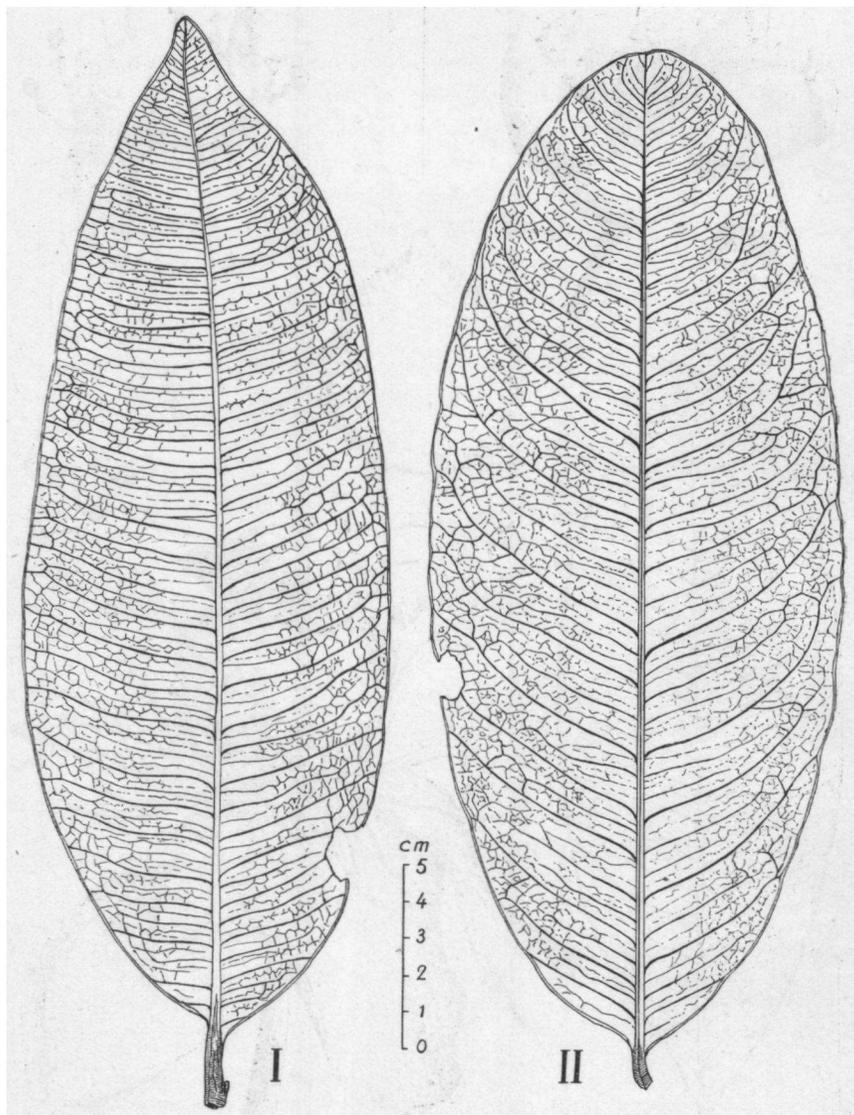


Fig. 6.

**I** *Rheedia macrophylla* (Mart.)  
Pl. et Tr. (B.W. 6569).

**II** *Rheedia Benthiana* Pl. et  
Tr. (B.W. 4945).

pallidiores, nervo mediano supra prominulo, in planta sicca carinula basali munito, subtus acutissime carinato, nervis primariis utrinque prominulis, subrectis, nervo marginali connexis, nervis minoribus numerosis interjectis. Flores (masculi) ad axillas foliorum plerumque delapsorum multi-fasciculati, pulvino globoso verrucoso inserti; pedicelli graciles, filiformes, 2—3 cm longi; sepala 2 orbicularia, circ. 1½—2 mm longa; petala 4 (5) oblonga, rotundata, reflexa, circ. 4—5 mm longa; discus centralis subsemiglobosus, saepe depressus, apiculatus, siccitate rugosus vel longitudinaliter sulcatus; stamina numerosa, circ. 30—40, discum cingentia vel nonnulla in discum ipsum inserta, filamentis filiformibus circ. 3—4 mm longis, antheris subglobosis, lateraliter dehiscentibus.

Flos hermaphroditus (BW. n. 1618, in Herb. Rheno-trajectino [Utrecht]). Stamina quam in flore masculo pauciora; ovarium cylindrico-ventricosum, verruculosum, discum apice depressum insidente; stigma sessile peltatum.

Fructus maturus (BW. n. 1818, in Herb. Rheno-trajectino [Utrecht]) globosus, circ. 4 cm diametro attingens, dentibus numerosis erectis circ. 4 mm longis siccitate longitudinaliter plicatis minutissime puberulis munitus.

Species quoad foliorum forma et dimensionibus valde variabilis.

Guiana batava, Brownsberg (B.W. n. 6119, cum fructibus maturis lectus Majo 1923); Brownsberg, arbor n. 1160 (B.W. n. 1754, ster., lectus Apr. 1916; n. 3240, cum alabastris masc. lectus Sept. 1917); Zandery I, arbor n. 103 (B.W. n. 1261, ster., lectus Nov. 1915; n. 3919, cum alabastris minutis lectus Julio 1918); Sectie O, arbor n. 523 (B.W. n. 1163, ster., lectus Oct. 1915; n. 1664, cum alabastris masc. lectus Mart. 1916; n. 2032, cum alabastris masc. lectus Junio 1916); Sectie O, arbor n. 589 (B.W. n. 1202, ster., lectus Nov. 1915; n. 1618, typus floris hermaphroditi, lectus Febr. 1916, in Herb. Rheno-trajectino; n. 1796, cum fructibus maturis lectus Junio 1916; n. 1818, typus fructus maturi,

lectus Majo 1916, in Herb. Rheno-trajectino); Waframiri, arbor n. 1604 (B.W. n. 1999, ster., lectus Junio 1916; n. 5445, cum fructibus immaturis lectus Oct. 1921, dubius); loco ignoto (Hostmann n. 593a ed. Hohenacker [P]; Kappler n. 593a, speciei et floris masculini typus, lectus ante annum 1850, in Herb. Rheno-trajectino [Utrecht]).

Guiana gallica, ad fl. Maroni (= Marowyne) (Mélinon s.n., cum fructibus maturis lectus [P]).

Species ab incolis Guianae batavae nominibus sequentibus designata:

Nopietja (S.D.); Nopitja, Mafakkie (N.E.); Baaha manie pau, Apakwie ie (Sar.); Asasie, Asasie horrorodikoro (Ar.); Nopietja, Tapoekim mopiekjo, Nopikiorian, Manierian, Aroome (Kar.).

Miquel, in describing his *Garcinia floribunda*, thought it the same as "*Garcinia brasiliensis* Mart. forma major in Para lectum" mentioned by Martius in Flora XXIV (1841), Beiblatt II, p. 34 (also published separately, p. 274, in "Herbarium Florae Brasiliensis", being notes about the plants distributed under this title). Although Martius' description is not very clear as to what he considered the type of his species, there can be no doubt that the plant Miquel cited as forma major (though not indicated as such by Martius) is that mentioned by Martius with the words: "Alteram foliis magis oblongis acutioribus, 6—7 poll. longis, 2—2 ½ latis, pedunculis duplo longioribus, in silvis prope Pará observavi." The Leyden Herbarium contains a sheet (H.L.B. 903, 343—354) bearing the following labels: "*Garcinia brasiliensis* Para, sylvis. Martii Herbar. Florae Brasil. No. 481" and "*Garcinia brasiliensis* Mart. cat. herb. fl. Bras. p. 274. Hab. in Brasilia." This must be the "forma major". The fact that these words are lacking on the labels supports the view that Martius had no intention to distinguish it as such. Presumably Miquel did not see this sheet, since it bears no notes in his handwriting.

This plant belongs to another species than Kappler 593a, the only Surinam specimen cited by Miquel with his *G. flori-*

*bunda*. Judging from the two half-mature smooth fruits (2 and 1 ½ cm l.) contained in an envelope on the Leyden sheet, it belongs to the section *Eurbeedia* Pl. et Tr. in which the whole of Martius' *G. brasiliensis* was already placed by Planchon and Triana themselves when they transferred it to the genus *Rbeedia*. This may be at least concluded from the fact that they mention both plants from Pará (Martius) and from M. Lucae (Luschnath, 1836), which latter specimen they identify with Martius' var. *parviflora*, and which, according to Engler in Fl. Bras. would be the very same specimen.

Though both Pl. and Tr. and Engler seem inclined to exclude Martius' plant from *Rb. floribunda*, they nevertheless cite *Garcinia brasiliensis* f. *major* among its synonyms.

Kappler 593a, which Miquel had specially in view when making his diagnosis of *G. floribunda*, though a male specimen, evidently belongs to the same species as those with long-echinate, nearly globose ripe fruits from Surinam, a fruiting specimen of which I also saw from French Guyana (Mélion without number, Maroni) in the Paris Museum, and which have leaves that are green when dry (against shiny brown in *Rb. brasiliensis*). All subsequent authors used the name *floribunda* for plants of this species.

Vesque, in D.C. Mon. VIII, 1893, p. 508, united *Rb. madruno* (H.B.K.) Pl. et Tr. (Colombia) with *Rb. acuminata* (Ruiz et Pav.) Pl. et Tr. (Peru), and attached Hostmann 593a (Surinam) as a variety *floribunda* to this enlarged *Rb. acuminata*. However, he retained the name *Rb. floribunda* Pl. et Tr. together with its synonyms for a specimen with smooth ovary (Spruce 2377, San Gabriel da Cachoeiro, Rio Negro, Brazil) determined by Engler as *Rb. floribunda*, but which he himself considered insufficiently known. The sheets labelled Hostmann 593a or Hostmann and Kappler 593a in various herbaria are probably duplicates of Kappler 593a, most of them distributed by Hohenacker.

Among the Surinam material in the Utrecht Herbarium there is also one specimen (Focke 1356) with smooth ovary. Though the warts on the ovary in specimens which I consider to belong to species with long-echinate fruits are often rather incompletely developed, it is still possible that Focke's plant is near the Colombian ones mentioned below.

In Contr. U.S. Nat. Herb. XIII, 1910, p. 455, pl. 93, 94, 95 Pittier gave photographs of some globose fruits, only warty, not echinate, which he refers to *Rb. madruno* (H.B.K.) Pl. et Tr., as he considered the evidence in favour of uniting this species with *Rb. acuminata* (Ruiz et Pav.) Pl. et Tr. as insufficient.

The original H.B.K. description of the fruit of *Calophyllum madruno* reads: "drupa (suppetens immatura) ovata, magnitudine fructus Citri aurantium, calyce corolla staminibusque crebris persistentibus cincta, flava, tuberculosa, cortice coriaceo. . . etc." Bonpland's type-specimens at Paris are all sterile, though Pl. and Tr. mention a very young fruit. A sheet at Paris labelled "N. Gren. Hb. Pierre" (perhaps a duplicate of the Goudot specimen also at Paris?) has a fruit like those figured by Pittier.

The herbaria of the British Museum and Kew contain (under *Rb. acuminata*) sheets from the herbarium of Ruiz and Pavon, without number, inscribed *Verticillaria acuminata*; another at Paris is labelled Pavon 36. These specimens bear elliptic, long-echinate fruits,  $\pm 2$  cm l., and are certainly another species than those with only warty fruits mentioned above.

The possibility remains that the Surinam plants really belong to *Rb. acuminata*, perhaps a variety, as was Vesque's opinion, but the evidence in favour of this seems rather insufficient. Moreover, the only Surinam sheet bearing fruits of almost the same shape and dimensions as those of *Rb. acuminata*, shows them much shorter echinate. Since this sheet (B.W. 5445) has also rather brownish leaves while another sheet (B.W. 1999, ster.), collected according to the label from the same tree, has

the ordinary pale green leaves, the possibility of an error in labelling or collecting should be taken into account. The case being as stated above, it seemed preferable to keep the Surinam plants separate until more complete material, not only from Guyana but also from Colombia and Venezuela, especially from the type localities of the species concerned, is available. It need scarcely be explained that above all fruiting specimens are required, if possible with fruits in different stages of development. The similarity of flowering plants belonging to different species fully explains Vesque's uniting them all.

The name *Rb. floribunda*, also used in Pulle's Enumeration, should be retained for the Martius plant cited by Miquel (probably only as a synonym).

*Rb. rostrata* Vesque (*Verticillaria rostrata* Miers mss.), considered by Engler (in Fl. Bras. and Engl. u. Prantl, Nat. Pfl. fam. 2 ed.) synonymous to *Rb. floribunda*, is better excluded. The type-specimen (Spruce 2609 from the Rio Uaupes) at Paris, duplicate at Kew, has leaves more like those of *Rb. Gardneriana* Pl. et Tr., and its rather long-beaked fruits, 4 ½ cm l., 3 cm br., have only warts of medium size. Planchon and Triana included the species in *Rb. madruno*.

Parts of "Hohenacker 593a" from Miers' herbarium in the Br. Museum are labelled *Rb. surinamensis*, but since Miers' herbarium abounds with manuscript-names and as I do not know what Miers' conception of the species was, nor whether there are any notes or manuscripts relating to it among Miers' papers, I consider it safer not to use this name.

The new diagnosis was drawn up from Kappler 593a in the Utrecht Herbarium, probably the same sheet as cited by Miquel.

The sheet of Hostmann 593a at Paris showing rather large leaves ( $\pm$  20 cm l. and 8 cm wide), though also having small ones with rounded apex (3 ¼ cm l. and 2 ¼ cm wide), induced Sandwith to include his plants from Br. Guyana in *Rb. floribunda* (in Kew Bull. 1931, no. 4, p. 177). An examination of the

material showed them to belong to *Rb. Benthamiana* Pl. et Tr., the principal differences between the two species being the nervation of their leaves (cf. pp 34 and 35), and their colour, which is often more or less silvery-green in *Rb. Kappleri*, as well as those of the petioles, pale greenish-yellow in *Rb. Kappleri*, brown or yellow in *Rb. Benthamiana*. Though the leaf-form in *Rb. Kappleri* is very variable, the long leaves shown by Hostmann's plant at Paris are rather an exception in flowering branchlets.

*Rb. pulvinata* Pl. et Tr. corresponds with *Rb. Kappleri* in its nervation and colour, while its leaves are about 23 cm l., but since the single specimen known (Triana, Andes de Bogota, Colombia), has only male flowers, I agree with Vesque in keeping it separate for the present.

#### **Tovomita** Aubl.

The ultimate cymose ramifications of the inflorescences generally bear a single flower only, suggesting that the lateral of each group of 3 flowers have pedicels jointed about the middle. In most species the female inflorescences are less branched and the flowers larger than in the male. The number of petals used by previous authors as one of the main distinguishing characters in their keys to the species of *Tovomita*, appears to be of much less constancy and value than generally supposed. Though Vesque's key is also partly based on the number of petals, he expressed his doubt about the validity of this character (in D.C. Mon. VIII, 1893, p. 195 and 213). Among the Surinam plants now determined as *T. Choisyana* Pl. et Tr. Tree n. 538 from Sectie O and Tree n. 1039 from Brownsberg have 7 petals, Tree n. 90 from Zandery I 6 petals, and Tree n. 141 from Brownsberg 9 petals.

A curious phenomenon, observed in most flowers of *Tovomita*, is the abnormal aestivation of some of the petals, where the outer and inner margins of two neighbouring petals interchange their position halfway up. A similar case in *Garcinia mango-*

*stana* L. is shown in Pierre's *Flore forestière de la Cochinchine*, pl. 54, fig. 3 and 6. cf. also Planchon and Triana in *Ann. Sc. nat.* 4e sér. XVI, 1862, p. 286.

The unisexuality is not very pronounced in the pistillate flowers, the "staminodes" being of the same shape as the stamens in the male flowers but for their smaller anthers, which may sometimes not be even sterile. In the male flowers on the other hand no traces of a pistil are to be found.

**Tovomita brevistaminea** Engl. in *Fl. Bras.* XII. 1. (1888) p. 446, t. 96, f. III.

The Surinam plants have only ♂ flower-buds, but the description could be completed as regards the ♀ flower and the fruit with a specimen collected by Hohenkerk (n. 727 [K]) in Br. Guyana.

Floris feminei staminodia quam floris masculi stamina graciliora. Fructus ovoideo-globosus, circ. 4 cm longus, parte quarta superiore in collum contractus, stylis 4 brevibus non articulatis coronatus.

**Tovomita carinata** Eyma n. sp. Fig. 7 (p. 36).

Arbor (?). Foliorum petioli circ. 2 cm longi, laminae oblongae, longitudine latitudinem  $2\frac{1}{2}$ —3-plo superante, apice obtusae vel subacuminatae, basi acutae, usque 15 cm longae, subcoriaceae, statu sicco atrae vel griseae, nervo mediano supra subplano, subtus expresso, nervis primariis subrectis utrinque prominulis vel supra planis, recte in nervum marginalem mergentibus, nervis ternis tenuioribus alternantibus, nervatione minore inconspicuo vel subtus prominulo. Inflorescentiae terminales, pauciflorae, ramis gracilibus. Alabastri subglobosi, 3—4 mm diametientis, pedicellus circ. 3 mm longus, sepala 2, petala 4, cum sepalis decussata, stamina (vel staminodia?) crebra, circ. 32, filamentis crassis linearibus 1— $1\frac{1}{2}$  mm longis siccitate nigris, antheris albidis, ovarium truncatum, longitudinaliter 10-costatum

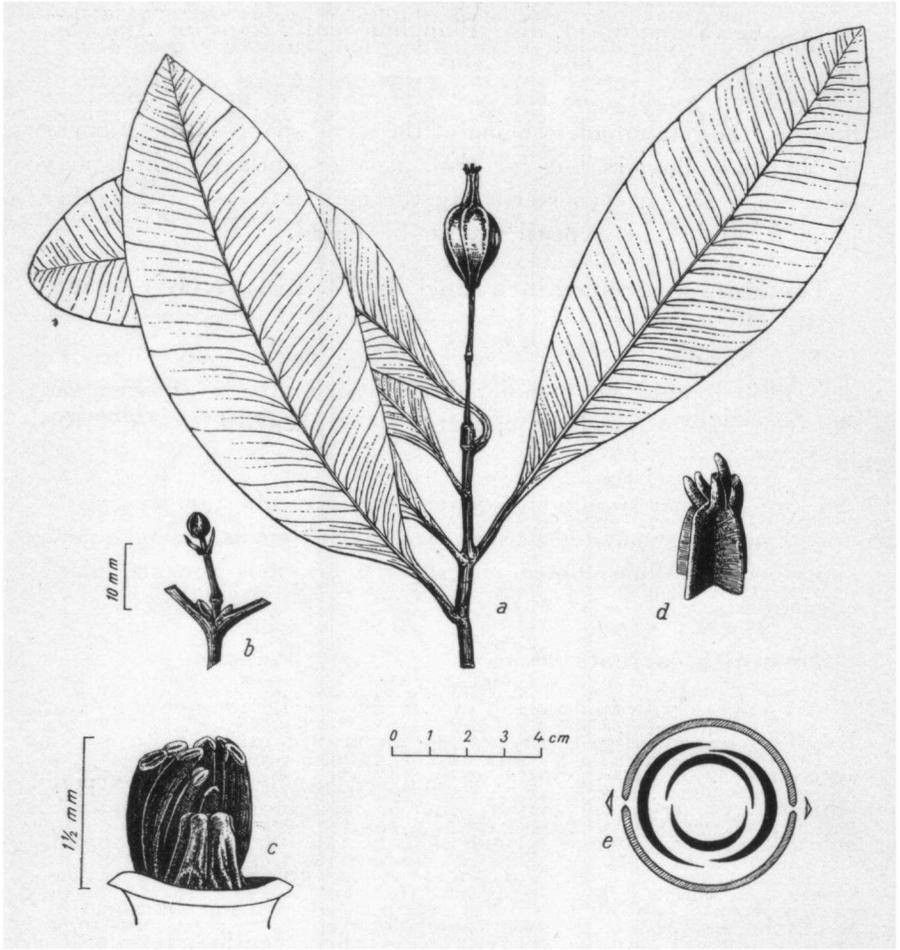


FIG. 7. *Tovomita carinata* Eyma  
 B.W. 6730: a habit; b flower-bud; c androeceum and ovary of b;  
 d upper part of fruit; e diagram.

(costis 2 pro carpello), apice in mamillas 5 breves crassasque stigmatibus nondum bene definitis divisum. Fructus lagoniformis, basin truncatum versus subattenuatus, parte tertia superiore in collum longum stylis 5 coronatum contractus, usque ad basin longitudinaliter 5-carinatus, carinis cum stylis 1—2 mm longis alternantibus, statu vivo extus viridis intus ruber, statu sicco extus niger, usque 2½—3 cm longus, pedicello gracili circ. 1 cm longo.

Guiana batava, in cacumine collis Brownsberg (B.W. n. 6730, typus, cum alabastro et fructibus lectus mense Julio anni 1924, in Herb. Rheno-trajectino [Utrecht]).

Related to *T. Spruceana* Pl. et Tr. from the Rio Negro and the Rio Uaupes, but the inflorescence of the latter is robuster, more like that of *T. Choisyana* Pl. et Tr.

**Tovomita cephalostigma** Vesque, Epharmosis III (1889) t. 96, and in D.C. Mon. VIII (1893) p. 207.

According to Vesque *T. cephalostigma* (type-specimen: Mélinon 435, French Guyana [P]) is chiefly distinguished by the anatomical character of its leaves lacking a hypoderm, which is present in the closely related *T. stigmatica* Pl. et Tr. (type-specimen: Triana s.n., Villavicencio, eastern slope of the Andes de Bogota, Colombia [P, K]) and *T. nigrescens* Pl. et Tr. (type-specimen: Schomburgk 901, British Guyana [dupl. P, NH]), whereas it is also lacking in the related *T. Eggersii* Vesque (type-specimen: Eggers 1073 ed. Toepffer [P]); moreover its leaves are more abruptly acuminate. The flower is the same in all three species, and very characteristic as regards the form of the stigmas and the very short outer stamens. In the Surinam specimens there is no hypoderm, but the subepidermal layer of cells, described by Vesque as "cellulae stratum 2 superiorum arctius connexae, subpaliformes" shows a rather variable development in different leaves. In B.W. 6536 and part of B.W. 6596 they are indeed more or less paliform, and of a

conspicuous pinkish-salmon colour, causing the reddish colour of the dry leaves, whereas in B.W. 6783, part of B.W. 6596, and also in Sandwith 391 from Br. Guyana, they are simply cubic, without the reddish colouring. In the last mentioned specimens the dry leaves are not reddish, while the nervation is more prominent above than in the first group; the leaves are also often somewhat narrower. As both types are represented among the flowering branches collected under B.W. n. 6596, though not on the same branch, and these branches do not show any difference in the inflorescence, I have considered them to be only modifications of the same, perhaps due to a more or less exposed position.

In Kew Bulletin 1931, n. 4, p. 176, Sandwith drew attention to the fact that the Guyana material cited by Engler with *T. guianensis* Aubl. actually belongs to *T. cephalostigma*.

**Tovomita Choisyana** Planchon et Triana in Ann. Sc. nat. 4e sér. XIV, (1860) p. 281; — *Micranthera clusiooides* Choisy in Mém. Soc. Hist. nat. Paris I, (1823—24) p. 210, pro parte, excl. syn. Rich.

Choisy founded his *Micranthera clusiooides* on several plants, considered by Planchon and Triana to belong to two different species. One of the specimens (Leblond, Fr. Guyana) cited by Choisy having been described before by Richard as *Clusia longifolia* (in Actes Soc. His. nat. Paris I. 1, 1792, p. 113), it is this specimen that must be taken as the type of *M. clusiooides*.

According to Planchon and Triana it was chiefly this male plant that served for the genus-diagnosis of *Micranthera* Choisy, whereas the drawing of the male specimen and the greater part of the description of *Micranthera clusiooides* were made from one of the other plants in De Candolle's herbarium.

When separating the two plants, Planchon and Triana named the first *Tovomita Richardiana* Pl. et Tr., the second *Tovomita Choisyana* Pl. et Tr.

Unfortunately enough their opinion with regard to the female plant of *M. clusioides* (figured by Choisy on plate XII) is rather confused and uncertain; on p. 281 they give as a synonym of *T. Choisyana* "*Micranthera clusioides* Choisy, Mem. Guttif. p. 15, tab. XI et XII? (exclus. synonym. L. C. Rich.)", but in the following description they do not mention the fruit any more; on the other hand, p. 274, at the end of the description of *T. Richardiana*, they state that the female plant figured by Choisy (plate XII), and which is represented at the Paris Museum by a Leblond specimen, differs from the male figured pl. XI by its 3-fruited inflorescence and from *T. Richardiana* by its lanceolate-elliptic leaves, narrowed at both ends, irregularly undulate and without mucro, and also by its inflorescence.

Now this fruiting specimen at Paris is quite identical with those from Surinam in the Utrecht herbarium, where male ones, obviously belonging to the same species, are equally well represented; as the latter closely correspond with Choisy's pl. XI, in my opinion Choisy was right in considering the plants figured on plates XI and XII to belong to the same species. The 3-fruited inflorescence is no valid objection since, in all species of *Tovomita*, the female inflorescences are much less ramified than the male ones, besides, only a few flowers in each inflorescence develop into ripe fruits.

Vesque's remark (Mon. p. 223) that the fruiting specimen is not identical with *T. Choisyana* nor with *T. Richardiana* because of the similarity of its crystalliferous epiderm to that of *T. martinicensis* Vesque, is of no value, as the anatomy of these two species is unknown.

Leblond's type specimen of *Clusia longifolia* Rich. in Herb. Delessert at Geneva, kindly sent by M. Hochreutiner, differs in its larger, broad-ovoid and very conspicuously apiculate flower-buds and in its robust pedicels; the rather long, cuneate-oblong leaves are perhaps of minor importance and the same applies to the number of petals. An additional description

together with some notes concerning this specimen were published under the name *Tovomita longifolia* by Hochreutiner in Ann. Cons. et Jard. bot. Genève XXI (1919) p. 66.

*Tovomita bahiensis* Engl. (type specimen: Luschnath, Ilheos, Bahia [B]) scarcely differs from *T. Choisyana*, but more material from that part of Brazil is required.

The same can be said of *T. Melinoni* Vesque (type specimen: Mélinon, Fr. Guyana [P]).

*Tovomita secunda* Poepp. apud Planch. and Triana in Ann. Sc. nat. 4e sér. XIV (1860) p. 271; — *T. brasiliensis* (Mart.) Walp. var. *secunda* Vesque in D.C. Mon. VIII (1893) p. 200.

The Surinam plants fairly correspond with the Poeppig specimens of *T. secunda* in the Paris Herbarium (a duplicate of one of the type-specimens: Poeppig 2376, from Maynas, Peru, and an unnumbered sheet labelled "Flor. Amazon. Coary"), only differing in the acumen of the leaf, which is blunt in the Surinam ones, sharp in *T. secunda*, and in the slightly more prominulous nervation of the upper surface of the leaves of the latter.

The more richly flowered inflorescences with flowers fascicled at the ends of the principal ramifications (like those figured for *T. tenuiflora* Benth. on t. 98 of the Fl. Bras.), their number in the type of *T. secunda* being reduced to three, may be fully accounted for by the circumstance that Poeppig's plants are female or hermaphrodite and the Surinam ones male, similar differences between male and female inflorescences being of common occurrence in the genus *Tovomita*.

Vesque considered *T. secunda* to be a well-characterized variety, perhaps a subspecies, of the rather polymorphous *T. brasiliensis*, differing from the latter in its flower-buds, which are narrowed towards the summit against cylindrical in *T. brasiliensis*, in the acute tip of its petals and in its sharp acuminate

leaves. As I have previously remarked, the last mentioned characteristic does not apply to the Surinam material.

The differences in general habit, chiefly due to the larger leaves in *T. secunda*, together with those already mentioned, make it advisable to keep *T. secunda* as a separate species. The only specimen seen occupying a somewhat intermediate position was an unnumbered sheet, collected by Triana near Bogota, Colombia [P]. An examination of some sheets from the Munich Herbarium collected by Martius, but bearing no identifications in his own handwriting, and determined by Engler as *T. brasiliensis*, together with the evidence from Martius's plate (Nova Gen. et Spec. I, 1824, t. 167, f. 1—13) seem to justify the present decision.

*T. secunda* resembles *T. stylosa* Hemsley (type-specimens: Fendler 298 and Sutton Hayes 367, both from Panama [K]) in general, especially as regards the leaves, but the latter species has longer flower-buds and very long and slender styles (cf. also t. 5 in Godman and Salvin, *Biologia centrali-americana*, Botany, Hemsley, V.).

*Vismia angusta* Miq. in *Linnaea* XVIII (1844) p. 27, and *Stirp. Surin. selectae* (1850) p. 88, adnot.; Sandwith in *Kew Bull.* 1931, n. 4, p. 174; — *V. latifolia* auctt., non Aublet.

In discussing the misinterpretation of Aublet's *V. latifolia*, Sandwith revives Miquel's name *V. angusta*, judging its identity with *V. macrophylla* H.B.K. not sufficiently proven.

A few additional notes, worth publishing in my opinion, follow.

The confusion about *V. latifolia* appears to have originated with Choisy, who, though not mentioning them in D.C. Prodr., determined some of Blanchet's plants as *V. latifolia*, and this has been continued by subsequent authors till it was revealed by Sandwith after an examination of Aublet's plant in the British Museum.

The type-specimen of *V. angusta* Miq. is Focke 584 in the Utrecht Herbarium; in 1850 Miquel also referred Hostmann 162 to his new species, stating at the same time that it should be nearer related to *V. ferruginea* H.B.K. than it is to *V. latifolia* Choisy, to which it had been referred by Steudel. This note probably induced Grisebach (Fl. Br. West Indian Islands, 1864, p. 111) and afterwards Reichardt (in Fl. Bras. XII. 1., 1878, p. 201) to unite *V. angusta* with *V. ferruginea*. However, the type-specimen of *V. ferruginea* at Paris (Hb. Bonpland, Orinoco) is very different, as was also stated by Sandwith, and more resembles *V. latifolia* in general appearance. Its chief features are its glabrous branchlets, its acute, not rounded, leaf-base, the conspicuous reticulated nervation on the upper side of the leaf, and the colour of the leaves, dark reddish-brown above, orange beneath. In the description, however, the younger branchlets are said to be finely rust-coloured puberulo-tomentose, and the leaf-base either acute or rounded.

Hostmann 162, together with some others was determined by Bentham as *V. macrophylla* (in Hook. Lond. Journ. Bot. II, 1843, p. 371). The type-specimen of *V. macrophylla* H.B.K. at Paris (Hb. Bonpland, Rio Cassiquiare, Venezuela) differs, not only in its almost glabrous leaves and the rather strong reticulation of their upper surface, but in the more equally dark-coloured anthers. Whether the same diagnostic value in these species should be attributed to the last mentioned character as I think justified in the case of *V. cayennensis* and *V. ramuliflora*, cannot yet be decided. This also prevented any definite opinion being formed about the western limits of *V. angusta*. In these circumstances I can only endorse Sandwith's conclusion that it is not improbable that future monographers will decide to treat *angusta* as a variety of *macrophylla*.

*Hypericum reticulatum* Poiret in Lam. Enc. Suppl. III, 1813, p. 694 = *Vismia reticulata* Choisy, Prodr. Mon. Hyperic., 1821, p. 34, and in D.C. Prodr. I, 1824, p. 542, was considered

a variety of *V. latifolia* Choisy by Reichardt in the Fl. Bras. If this should prove correct priority could be claimed for the name *reticulata*, but since authentic material was not seen, and the specimens labelled *V. reticulata* at Paris and differing from *V. angusta* in their nervation and more equally dark-coloured anthers, are perhaps not that species (cf. Sagot in Ann. Sc. nat., 6e sér. XI, 1880, p. 163: *V. latifolia* Aubl. var. *glabrescens* Sagot), no definite conclusion could be reached.

*Vismia cayennensis* (Jacq.) Pers., Syn. II (1807) p. 86,  
— *Hypericum cayennense* Jacq., Enum. Pl. Carib. (1760)  
p. 28 and Sel. Stirp. Am. Hist. (1763) p. 213.

Jacquin's type specimen is probably lost, but the abundance of material from the same and neighbouring localities leaves little doubt as to the correct interpretation of his description. The specimens seen were all nearly glabrous, except the young calyx, but a specimen from Bolivia (Steinbach 7252 bis) in the Utrecht herbarium has its younger parts (branchlets, pedicels, inflorescence and leaves, though the latter only slightly) more or less covered by a stellate indumentum.

Hostmann 438 and some other specimens were supposed to be a variety of *V. cayennensis* by Bentham (in Hook. Lond. Journ. Bot. II, 1843, p. 371), yet the Hostmann plant does not differ from those generally considered the true *V. cayennensis*.

The leaves of *V. cayennensis* vary from dull to shiny and also in the colour of their upper surface, which may be from grayish to dark-reddish-black or violet-black in the dry plant.

Perhaps a plant in Linné's herbarium (at the Linnean Soc., London), collected in Surinam by F. Allamand, should be referred to this species. It is characterized by its very dark and shiny leaves and has small globose buds. This sheet bears no determination by Linné. Another sheet, inscribed "*Hypericum cayense*" in Linné's handwriting, but without further indications, contains, besides one branchlet belonging to *V. cayennensis* as

it is now generally understood, several others dubious or better excluded.

*Vismia confertiflora* Spruce apud Reichardt in Fl. Bras. XII, 1 (1878) p. 205.

The Surinam plants now referred to this species have smaller and more contracted inflorescences than most of Spruce's sheets; the closest resemblance to them is furnished by a Spruce specimen at the British Museum. Some of the Surinam plants have also rather large and robust flowers.

Besides Spruce's plant from Santarem, Pará (R. gives no number; a sheet at Kew bears the number 1091, that in the Br. Museum is not numbered), Reichardt mentions plants collected by Martius in the "prov. do Alto Amazonas ad Manáos et inter Paramirim et Maribi". Of two Martius sheets, both determined by Reichardt, kindly sent by the Munich Herbarium, one, labelled "in sylvis ad Barra do Rio Negro et Coari", though having a short congested inflorescence and rather broad leaves, belongs to the same species as Spruce's plant, but the other Martius sheet, also from Rio Negro, should perhaps be excluded.

On the other hand a plant collected in Surinam by Menge (in Wulschlaegel's herbarium, now at Brussels) and determined by Reichardt as *V. baccifera*, should be included in *V. confertiflora*, as was another Wulschlaegel plant (also by Reichardt) in the same herbarium. The type-specimen of *Hypericum bacciferum* L. is not in Linné's herbarium at the Linnean Society, London, but the various interpretations attempted by several authors, and also some of the other specimens mentioned by Reichardt under this name, all refer to plants with a rather different general appearance.

*Vismia latifolia* (Aubl.) Choisy, Prodr. Mon. Hyp. (1821) p. 36 and in D.C. Prodr. I (1824) p. 543, sensu Sandwith

in Kew Bull. 1931 n. 4, p. 174; — *Hypericum latifolium* Aublet, Hist. Pl. Guiane française (1775) II, p. 787, IV, pl. 312, f. 1.

The confusion of this species with *V. angusta* Miq. was cleared up by Sandwith after an examination of Aublet's type-specimen in the British Museum.

Specimens of *V. latifolia* were also confounded with some other species by several authors. So *V. Hilairii* was described by Gardner (in Hook. Lond. Journ. Bot. II, 1843, p. 334) from his sheet n. 329, which he thought the same as the plant described by St. Hilaire (Fl. Bras. mer. I, 1825, p. 327) under the name of *V. guianensis*, but any specimens of which he probably had not seen. St. Hilaire's plants at Paris (from Minas Geraes) belong to *V. latifolia*, but this is not the case with Gardner 329 at Kew which approaches *V. guianensis* (Aubl.) Choisy.

Several specimens determined as *V. magnoliaefolia* Cham. et Schl. in various Herbaria (a species published in Linnaea III, 1828, p. 118) also belong to *V. latifolia*, but the Sello sheet at Kew, probably a duplicate of the type, differs from *V. latifolia* in some respects, e.g. no truncate flower-buds.

*V. latifolia* is often subject to a disease causing small light-coloured ramified blisters on the leaves, or even yellowish warts on the inflorescences and fruits. This leaf-disease was found with several specimens. A sterile sheet labelled "*V. rufescens?* Pers., André 427, Islitas, Rio Nari (Colombia?)" in Herb. Kew shows the same blisters, while also its general appearance, with the exception of the almost glabrous under-surface of its leaves, corresponds with *V. latifolia*.

*Vismia ramuliflora* Miq., Stirp. Surin. sel. (1851) p. 88.

This species, described by Miquel from a specimen sent by Kappler (n. 1823, ed. Hohenacker), closely resembles *V. cayennensis* (Jacq.) Pers. in general appearance, as was already pointed out by Miquel himself. This may have induced Reichardt

to unite it with *V. cayennensis* in the Fl. Bras. (XII. 1. 1878, p. 199), without citing the original plant however; probably he did not see it. Now the differences mentioned by Miquel (broader leaves, shorter sepals and lateral inflorescence in *V. ramuliflora*) are hardly sufficient to justify the formation of a new species, but the following distinguishing characters, which I could verify with 3 more specimens among the B.W. collections, confirm Miquel's opinion:

1. In *V. ramuliflora* the connective bears, just above the insertion of the filament, a well-defined, small black spot, which is lacking in *V. cayennensis*, whereas the latter has a blackish, glandular discolouration at the apical parts of the anthers.
2. The moment before spreading, the petals of *V. ramuliflora* are conically rolled together and about twice as long as the sepals, whereas in *V. cayennensis* the petals begin spreading as soon as the opening of the calyx allows them.
3. In *V. ramuliflora* the fruits are globose with pointed apex, in *V. cayennensis* the young fruits are ovoid to ellipsoid-oblong, the older ones more or less globose, but their apex is always more or less rounded.

#### LECYTHIDACEAE.

*Bertholletia excelsa* H.B.K., Pl. aequin. I (1808) p. 122, t. 36 and Nov. Gen. et Sp. VII (1825) p. 201, Miers in Trans. Linn. Soc. XXX (1874) p. 196, t. 37. — *B. nobilis* Miers l.c. p. 197, t. 37.

I fully agree with Sprague who, in his account on this subject published in a paper by Sands ("Further notes on the Brazil-nut tree in Malaya" in Malayan Agric. Journ. XIV, 5, 1926, p. 125) rejected the differences formulated by Miers, and confirmed the view held by some authors that the trees cultivated in Malaya should belong to one species. The opinion cited here was chiefly based on a study of the authentic material used by Miers.

In his notes accompanying two photographs of a number of fruits from trees cultivated at Kuala-Lumpur, Sands points to the considerable range of variability in size and shape when from different trees as compared with their uniformity in the same tree.

Curiously enough the material of *Bertholletia* in several of the principal herbaria is very scanty and moreover mostly without flowers. As a consequence no analysis of the flower could be made; the (incomplete) data concerning the androeceumhood were taken from some dried flowers, labelled *B. nobilis*, in the British Museum, and from Poiteau's drawing in Mém. Mus. d'Hist. nat. Paris, XIII (1825) pl. 4 (= tab. 3).\*

The simultaneous germinating of several seeds through the small opercular opening was described by Young in Bot. Gaz. LII, (1911) p. 226.

*Couratari* Aublet, Hist. Pl. Guian. franç. II (1775) p. 723.

*Allantoma* Miers in Trans. Linn. Soc. London XXX (1874) pp 291 and 170.

Aublet's diagnosis of the genus *Couratari* only contains a description of the fruit and the seeds, which is not repeated in the short Latin description of the single species *C. guianensis*. In the subsequent French text, which is much more extensive, Aublet says that he did not see any flowers of this tree, but that he often found the fruits lying on the earth. Plate 290 comprises a leaf-bearing branchlet, a fruit, an operculum, and a circumalate seed. The incompleteness of Aublet's diagnosis has given rise to several arbitrary interpretations. Even now the flowers of *C. guianensis* are still unknown, nor did I find among the Guyana collections any specimens showing at the same time leaves and fruits like those figured by Aublet, though separate fruits of this shape but generally less ribbed are present

\* Additional note. The exactness of Poiteau's drawing was verified with a flower of Hb. Rio n. 11363.

among the carpological collections of several large herbaria. The sterile, leaf-bearing branch in the British Museum could not with any certainty be identified with any other, the nearest approach to it being perhaps some sterile branches at Leyden (Splitgerber 894, from Surinam, and another, probably a duplicate of the former). The flowering branch and flowerparts figured and described by Richard as *Couratari guyannensis* (in Ann. Sc. nat., 1e sér. I, 1824, p. 321, Atlas t. 21) belong to some *Eschweilera* (cf. also Miers p. 168 and Sagot p. 206).

Sagot, in Ann. Sc. nat., 6e sér. XX, 1885, p. 205, suggested that the leaves figured by Aublet should not belong to the same plant as the fruit and the seed, but his opinion, largely based on a false interpretation of his own materials (cf. p. 63), remains unproved.

Berg, in Linnaea XVII, 1854, p. 462, and in Fl. Bras. XIV. 1, 1858, p. 506—514, put together under *Couratari* some very different plants, for which he was justly criticized by Miers, who, however, made a similar mistake with his genus *Allantoma*.

Berg defines the genus *Couratari* as having an obliquely truncate, non-hooded, androeceum, a 3—6-celled ovary, and either circumalate or unilaterally winged seeds. In the Fl. Bras. he subdivides *Couratari* in *Eucouratari* Bg. and *Cariniana* Casar.; the latter used in the same sense as it is nowadays, but the former comprising, besides *Couratari guianensis* with circumalate seeds and some species, the seeds of which are unknown, but which will probably also be circumalate, several other species (*C. macrocarpa* Mart. ap. Bg., fr., *C. aulacocarpa* Mart. ap. Bg., fr., *C. dictyocarpa* Mart. ap. Bg., fr., and *C. lineata* Bg., leaves and fr.) afterwards placed by Miers in his genus *Allantoma*, and which indeed, judging from the 4—5-celled fruits and from the similarity of the leaves of *C. lineata* with others whose leaves as well as fruits and seeds are known, should have oblong, verrucose, non-winged seeds (cf. also Ducke in Archivos Jard. Bot. Rio de Janeiro IV, 1925, p. 155).

The species with a hooded androeceum with echinate, abruptly recurved tip, 3-celled ovary, and circumalate seeds, Berg referred to the genus *Lecythopsis*, founded by Schrank (in Denkschr. Ak. Wiss. München VII, 1821, p. 241) on a fruit showing traces of 3 septa and with circumalate seeds.

It may appear strange that Berg did not combine Schrank's *Lecythopsis fumatoria* and *Couratari guianensis* Aubl. into one genus, as had been done by de Candolle in Prodr. III, 1828, p. 294. Miers in Trans. Linn. Soc. London XXX, 1874, pp 168 and 279, again put *Lecythopsis* Schrank, as well as *Lecythopsis* Schrank emend. Berg among the synonyms of *Couratari* Aubl. Why Miers also considers *Cariniana* (in parte) Berg (non Casar.) a synonym of *Couratari* Aubl. is not clear.

Besides the interpretations of *Couratari* reviewed above, some species of *Cariniana* have originally been described as *Couratari*.

When Miers founded his genus *Allantoma* in 1874, he included 12 species, but, from the fact that the material of none of them was complete, his generic diagnosis is a mixture of characteristics belonging to plants which should be referred to very different genera.

According to Miers the characteristics of *Allantoma* are:

- a. the androeceum-hood with a smooth, not echinate, reflexed tip.
- b. the 3—5-celled ovary (3-celled in 3 spp.; 4-celled in 6 spp.; 4—5-celled in 1 sp.; 5-celled in 2 spp.).
- c. the warty, non-winged seeds.

Ducke, in Arch. Jard. Bot. Rio de Janeiro IV, 1925, p. 154, considers the warty, non-winged seeds to be the principal characteristic of *Allantoma*. Moreover he considers *Goeldinia* (2 species described without fruit by Huber in Boletim do Museu Paraense III, 1902, p. 438) to be the flowering stage

of *Allantoma lineata* (Berg) Miers, described and figured by Berg with leaves and fruit but without seeds or flowers. The flowers of *Goeldinia* resemble those of some species of *Cariniana* Casar. in having a truncate, not hooded, androeceum, but *Cariniana* has unilaterally winged seeds and usually a 3-celled ovary. I could not discover whether Ducke himself saw any fruits or seeds of *Allantoma lineata* or whether he took his description from Miers, but the seeds and leaf of *A. Burchelliana* Miers (supposed by Ducke to be the same as *A. lineata*, together with some other species mentioned by Miers) I saw in the British Museum, confirm Ducke's view that these warty non-winged seeds belong to plants with flowers and leaves like *Goeldinia*.

Though Ducke gives no definite opinion on the species with a hood-like androeceum, because he does not know what their seeds are like, there can be no doubt that they cannot be retained in the same genus together with *Allantoma lineata*. This is also proved by the two Surinam species, *Couratari fagifolia* (Miq.) Eyma and *Couratari pulchra* Sandw., both flowers and fruits of which are present, and which have, at the same time, broadly winged (circumalate) seeds and a hood-like, smooth androeceum with reflexed tip.

Consequently, from what has been said it follows that the question which species should be considered the type of Miers's *Allantoma* is of prime importance for the nomenclature of the species grouped by Miers in *Allantoma*, as well as of those of *Goeldinia* Huber.

As the existing rules do not provide in such cases, it was decided at the Botanical Congress, held at Cambridge in 1930, to refer the working out of rules governing the choice of a lectotype to the Executive Committee of Nomenclature.

These rules will be submitted to the next Congress, which is to be held at Amsterdam in 1935. In the meantime Mr. Sprague has been so kind as to give his personal opinion on the question,

and to prepare a paper on it (published in Journ. Bot. LXX, 1932, p. 231) so that it might serve as a test-case. Accepting the characters of the fruit as the fundamental part of Miers's description of *Allantoma* (ἄλλαμα = sausage, ἴμορ = like), and excluding all those specimens not seen by Miers, he came to the conclusion that *A. torulosa* Miers, which is the most completely known of the fruiting species seen by Miers, should be designated as the lectotype of the genus *Allantoma*. *A. torulosa* Miers was described, in Trans. Linn. Soc. London XXX, 1874, p. 293, t. 64, f. 1—3, from material collected by Farries near Culantingo, Rio Maranhão, which Miers supposed to be the Curuatingo, a river flowing from the south side into the Amazonas 9 leagues to the east of Santarem. Farries 69, leaf and fruit, is in the British Museum; an unnumbered fruit without operculum is at Kew. The fruit from the Br. Museum, showing traces of 5 cells, and an oblong, verrucose, non-winged seed are figured on Miers's tab. 64, f. 1—3.

The hooded species with 3-celled ovary and circumalate seeds consequently discarded from *Allantoma* can best be included in *Couratari* Aubl., together with *Lecythopsis* Schrank and *Lecythopsis* Schrank sensu Berg (the latter including the species with echinate hood). *Couratari* Aubl. was described with circumalate seeds, 3-celled fruits, and leaves only, and there is no certainty as to whether its androeceum-hood will prove to be echinate or smooth. However this may be, the differences between the two types of plants are not in my opinion very fundamental, those in the hood as well as in the length of the pedicels being of the same order as those in the genus *Eschweilera* Mart. sensu Ndz., while the different appearance of the leaves of e.g. *C. rufescens* Camb. on the one side, and *C. fagifolia* (Miq.) Eyma and *C. multiflora* (Smith) Eyma \* on the other, is of no importance, as proved by *C. pulchra* Sandw.

\* Judging from Parker s.n. [N H].

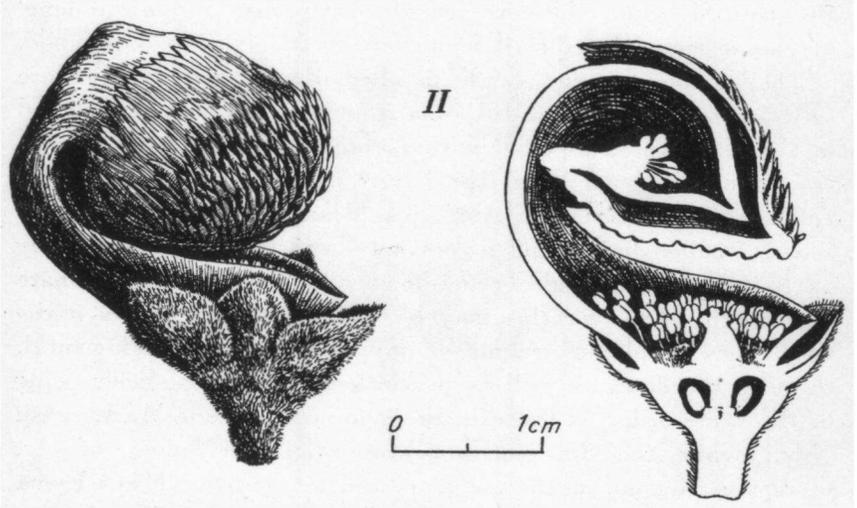
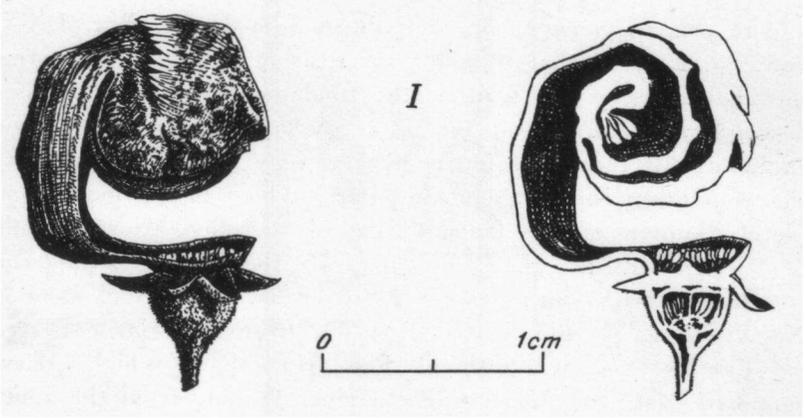


FIG. 8. **Couratari**. Drawing of flowers to show the androecium-hood.  
(petals removed).

I *C. pulchra* Sandw. (B.W. 4734).

II *C. rufescens* Camb. (Hb. Rio n. 5019 [U]).

The principal characters of the genera with pipe-like fruits are summarized in the following conspectus. It may be well to note that not all species could be extensively analysed and compared, at least as far as the non-Surinam species are concerned. Accordingly the author cannot certify the specific value of all the species mentioned below.

**Couratari** Aubl., charact. emend.

Sepala 6. Petala 6. Androeceum uno latere in ligulam longissimam spiraliter incurvatam, apice reduplicatim reflexa echinatam vel glabrem crassissimamque, anantheriferam expansum. Ovarium 3-loculare. Pyxidium cylindricum vel anguste subturbinato-cylindricum, longitudine latitudinem pluries superante. Semina circumalata.

Species: 1. *C. guianensis* Aubl., typus generis; 2. *C. fagifolia* (Miq.) Eyma, nov. comb. = *Lecythis fagifolia* Miq. ap. Bg. = *Allantoma fagifolia* (Miq.) Miers = *Allantoma subramosa* Miers p.p. = ? *Couratari? coriacea* Mart. ap. Bg. = ? *Couratari Vriesii* Miers; 3. *C. fumatoria* (Schrank) Eyma, nov. comb. = *Lecythis fumatoria* Schrank = ? *C. Lecythisopsis* Mart.; 4. *C. glabra* Camb. = *Lecythisopsis glabra* (Camb.) Bg.; 5. *C. multiflora* (Smith) Eyma, nov. comb. = *Lecythis multiflora* Smith = *Allantoma multiflora* (Smith) Miers; 6. *C. paraensis* Mart. ap. Bg.; 7. *C. pulchra* Sandw.; 8. *C. rufescens* Camb. = *Lecythisopsis rufescens* (Camb.) Bg. = *Lecythis pyramidata* Vell., teste Miers.

**Cariniana** Casaretto

Calyx 6- rarius 5- vel 7-dentatus vel -lobatus vel -partitus. Petala 6, rarius 5 vel 7. Androeceum cylindricum, oblique truncatum vel interdum subgaleatum, intus staminiferum, margine laeve vel in laciniis antheriferis abeunte. Ovarium 3- rarissime 4-loculare. Pyxidium cylindricum vel anguste subturbunato-cylindricum, longitudine latitudinem pluries superante, plerumque

crassum, zona operculari quam zona calycari angustiore. Semina apice alata.

Species: 1. *C. estrellensis* (Raddi) OK. = *Couratari Estrellensis* Raddi = *Cariniana excelsa* Casar., typus generis; 2. *C. legalis* (Mart.) OK. = *Couratari legalis* Mart. = *Car. brasiliensis* Casar.; 3. *C. decandra* Ducke; 4. *C. domestica* (Mart.) Miers = *Couratari domestica* Mart.; 5. *C. exigua* Miers; 6. *C. integrifolia* Ducke; 7. *C. Kuhlmannii* Ducke; 8. *C. micrantha* Ducke; 9. *C. pyriformis* Miers; 10. *C. rubra* (Gardn.) Miers = *Couratari rubra* Gardn. mss.

**Allantoma** Miers, charact. emend.

Calyx 5-dentatus. Petala 5. Androeceum cylindricum, oblique truncatum, intus appendiculis digitiformibus antheriferis inflexis vestitum, margine in laciniis antheriferis inflexis majoribus abeunte. Ovarium 4—5-loculare. Pyxidium cylindricum vel anguste subturbinato-cylindricum, longitudine latitudinem pluries superante. Semina oblonga, verrucosa, non alata.

Species: 1. *A. torulosa* Miers, typus generis; 2. *A. corbula* Miers; 3. *A. dictyocarpa* (Mart.) Miers = *Couratari dictyocarpa* Mart. ap. Bg.; 4. *A. lineata* (Bg.) Miers = *Couratari lineata* Berg = *A. cylindrica* Miers = ? *A. aulacocarpa* (Mart.) Miers = ? *Couratari aulacocarpa* Mart. ap. Berg = ? *A. macrocarpa* (Mart.) Miers = ? *Couratari macrocarpa* Mart. ap. Berg = ? *A. Burchelliana* Miers = *Goeldinia riparia* Hub. = *Goeldinia ovatifolia* Hub. (all synonymy of *A. lineata* teste Ducke); 5. *A. scutellata* Miers.

*Species non satis notae et quoad genere dubiae:*

*Couratari Martiana* (Bg.) Miers = *Lecythis Martiana* Berg;  
*Couratari tauari* Berg;

*Cariniana uahupensis* (Spruce) Miers = *Couratari Uaupensis* (Spruce) Berg = *Goeldinia* ? *uaupensis* (Spruce) Huber = *Amphoricarpus Uaupensis* Spruce in sched.

*Couratari Glaziovii*: specimina ab auctoribus diversis hoc nomine designata sed non descripta, characteribus mihi ignotis.

*Couratari fagifolia* (Miq.) Eyma, nov. comb.; — *Lecythis fagifolia* Miquel apud Berg in *Linnaea* XXVII (1854), p. 451; — *Allantoma fagifolia* (Miq.) Miers in *Trans. Linn. Soc. London* XXX (1874) p. 298; — ? *Couratari ? coriacea* Mart. apud Berg in *Fl. Bras.* XIV. 1. (1858) p. 510, t. 75; — ? *Couratari Vriesii* Miers, l.c. p. 284; — *Allantoma subramosa* Miers, l.c. p. 292, pro parte.

The type-specimen of *Lec. fagifolia* Miq. ap. Berg is Kappler 1830 in Kegel's herbarium (now in the Herbarium at Göttingen), probably one of those sheets distributed by Hohenacker bearing the name given to it by Miquel, as are the duplicates that were examined at Utrecht, Brussels and Paris.

Though most specimens now referred to *C. fagifolia* have a richer and more ramified inflorescence and less sharply acuminate leaves, the similarity of the flowers as well as the variability to which the whole plant seems to be subject, appear to justify the present conception.

The fruits, collected by the Forestry Service of Surinam from the same trees which yielded the flowering branches identified with *L. fagifolia*, are almost identical with a fruit at Kew which, though bearing no determination, should, from the evidence of the label inscribed "Couratari sp., Surinam, Prof. de Vriese", be the type-specimen of *C. Vriesii* Miers. A fruit in the British Museum labelled "Couratari Vriesii, Surinam" belongs to another species. Judging from plate 75 fig. II in the *Fl. Bras.*, *Couratari ? coriacea* Mart. apud Berg, from the State of Pará, may equally be the same as *C. fagifolia*. Both *C. coriacea* and *C. Vriesii* have been described with fruits only. The seeds now available from the Surinam plants are broadly circumalate. A specimen, evidently belonging to *C. fagifolia*, but with small, somewhat deformed fruits and very young leaves (the sheet in the Paris Herbarium bearing

the note "folia novella"), collected by Sagot at the upper Karouany River in French Guyana from a felled tree, from which he had previously collected flowering branchlets, was misinterpreted by him as *Couratari guianensis* Aubl. As the leaves of his specimen did not correspond with those shown in Aublet's plate, Sagot drew the conclusion that the leaves and the fruit and seed of Aublet should not be put together (cf. Sagot in *Ann. Sc. nat.*, 6e sér. XX; 1885, p. 205).

As for the type-specimen of *Allantoma subramosa* Miers, founded on Sagot 271, collected in French Guyana (not, as Miers erroneously writes, in Dutch Guyana), Sagot himself declares (l.c. p. 206) that leaves of some other plants had been mixed up with inflorescences of what is now called *C. fagifolia*, and which he thought to be the same as *C. guianensis*. Obviously the mistake was discovered after the duplicates of Sagot 271 had been distributed, as only the sheet at Paris bears some notes referring to this confusion. The similarity of the flowers is a strong argument that indeed things are as Sagot thought them to be, though in view of the coincidence that the leaves in question are of the same type as those of *C. pulchra* Sandw., some reserve may be advisable. The lilac colour of the androeceum-hood in Sagot 271 mentioned by Miers, and which he, on this sole evidence, holds to be a generic feature of *Allantoma* (l.c. p. 170), was not observed in the other specimens of *C. fagifolia* more closely examined. I strongly suspect the much branched inflorescences of *A. subramosa* to be an abnormality, though rather frequent also among the other specimens of *C. fagifolia* examined.

*Lecythis multiflora*, described by Smith in Rees's Cyclopaedia XX (1819), was placed by Miers in *Allantoma* as *A. multiflora* (Smith) Miers, whereas Sagot numbered it among the synonyms of *Couratari guianensis*, together with *Lec. fagifolia*, *All. fagifolia* and *All. subramosa* p.p. The type-specimen of *Lec. multiflora* in Smith's herbarium at the Linnean Society's, London (a

specimen given to Smith by Rudge in 1808, and according to Miers collected by Martin in French Guyana), is evidently closely related to the above-mentioned plants, but its more rigid inflorescence and the absence of leaves make it safer to keep it separate.

*Couratari pulchra* Sandw. in Kew Bull. 1932, n. 5, p. 217. — Fig. 8 (p. 52).

The Surinam plants were first considered distinct from that collected by Sandwith in British Guyana (n. 122) on account of their very densely tomentose rhachis, pedicels and sepals, fulvous when dry, whereas in the specimen from Br. Guyana they are less densely tomentose and wine-red when dry. After a more close examination, however, there was no further justification in keeping them separate, the structure of the flower as well as the leaves being the same. An exception should be made for B.W. 2620 (without flowers) in which the indumentum is less dense, showing distinct stellate hairs, and whose leaves are more shiny and green above, with somewhat recurved margins, while the fruits differ from the others collected in Surinam in their being of a softer texture thus causing their flattening in drying, and in the central umbonate depression of the operculum.

The fruits, collected from the same tree as some of the inflorescences referred to above, may be described as follows:

Fructus cylindricus subtriangularis, parte media diametro basin et apicem nonnihil excedente, basi rotundato-saccato, pedicello excentrice inserto, statu sicco inconspicue longitudinaliter costatus, textura crasse chartacea, brunneus, lentice llatus, longitudine circ. 12 cm attingente, parte interzonalis 5—8 mm alta, circ. 4—5 cm diametiente, operculum inconspicue radiatim sulcato, seminibus margine lato membranaceo circumalatis.

Guiana batava, Zandery I, arbor n. 190 (B.W. n. 3617, cum fructibus maturis lectus mense Januario anni 1918 [U]; ejusdem arboris B.W. n. 1568 lectus Jan. 1916 et n. 1801 lectus Jun. 1916).

Specimina alia fructifera in Guiana batava lecta: Brownsberg, arbor n. 1037 (B.W. n. 5064, lectus Mart. 1921, n. 5598, cum fructibus anomalis lectus Jan. 1922); Tempatie (B.W. n. 2620, lectus Dec. 1916, dubius).

*Couroupita guianensis* Aublet, Hist. Pl. Guiane fr. (1775) II, p. 708, IV, t. 282.

var. *surinamensis* (Mart.) Eyma; — *C. surinamensis* Mart. ap. Berg in Linnaea XXVII (1854) p. 462, and in Fl. Bras. XIV. 1. (1858) p. 476, t. 57, 58, 59.

A specie differt fructu medio zona calycari cincto.

Guiana batava, Paramaribo (Wullschlaegel n. 202, fl. [B], fructum in Fl. Bras. delineatum non vidi).

Venezuela, Miranda (Pittier n. 6301, ex Knuth in Fedde, Repert., Beih. XLIII, 1928, p. 512, non vidi).

*Eschweilera* Mart. sensu Niedenzu.

This genus, founded by De Candolle in 1828 (Prodr. III, p. 293) on plants and manuscript notes accompanying them in Martius' herbarium, was not accepted by several authors, who included it in the existing genus *Lecythis* Loeffl., even after Martius had given a more complete description in 1837 (in Bot. Zeit., Flora, XX, Beibl. 2, p. 89, also published separately as Herbarium Florae Brasiliensis); cf. Miers in Trans. Linn. Soc. XXX, 1874, p. 165, and Pittier in Contr. U.S. Nat. Herb. XII, 1908, p. 96.

In 1874 Miers, l.c. p. 199, separated from *Lecythis*: "all those species where, in the ovary, the ovules are erect, unsupported by funicles, and where in the fruit the operculum is not attached to a central columella, where the seeds are bitter (not edible), are not suspended in pulp by a large fleshy funicle or strophiole, but are always dry, erect, and attached to the

base of the fruit by a large hilum". The species so defined, together with those already described under *Eschweilera*, he grouped in three genera, two being new, viz. *Chytroma* Miers, *Eschweilera* Mart., and *Jugastrum* Miers, which were reduced by Niedenzu (in Engl. u. Prantl, Nat. Pfl.fam. III, 7, 1898, p. 38) to sections of one genus, for which he retained the old name *Eschweilera*.

I do not think the value of even these sections, at least of the first two, sufficient to maintain them. Their chief character, the number of ovary-cells, leads, as remarked by Sagot (in Ann. Sc. nat., 6e sér. XX, 1885, p. 211), to the separating of species often very closely related in other respects. I could myself state the variability in several cases of the number of ovary-cells among specimens of the same species or even among flowers of the same sheet.

As may be seen from the key in Pulle, Flora of Surinam Vol. III (1932) p. 131 and from fig. 9 the androeceum-hood shows in several species some very characteristic differences, which seem to have been completely overlooked by the majority of previous authors; they constitute however an easy means of distinguishing some species superficially much alike, and whose characters, as nervation and general appearance, are difficult to define sufficiently so as to be understood by the non-specialized reader.

*Eschweilera amara* (Aubl.) Ndz. in Engler u. Prantl, Nat. Pflanzenfamilien III, 7, (1898) p. 40; — *Lecythis amara* Aublet, Hist. Pl. Guiane fr. (1775) II, p. 716, IV, pl. 286 (omnino?); — *Chytroma amara* (Aubl.) Miers in Trans. Linn. Soc. XXX (1874) p. 231; — *Eschweilera corrugata* auctt., Miers, l.c. p. 253 (pro parte). — Fig. 9 (p. 60).

Aublet's plant in the British Museum, interpreted as *L. amara*, bears no determination in his own handwriting, nor does any other of Aublet's plants. Its leaves, except one erroneously pasted on the sheet and probably belonging to *Symphonia* or *Moronobea*, show the same very dense reticulation as the Surinam

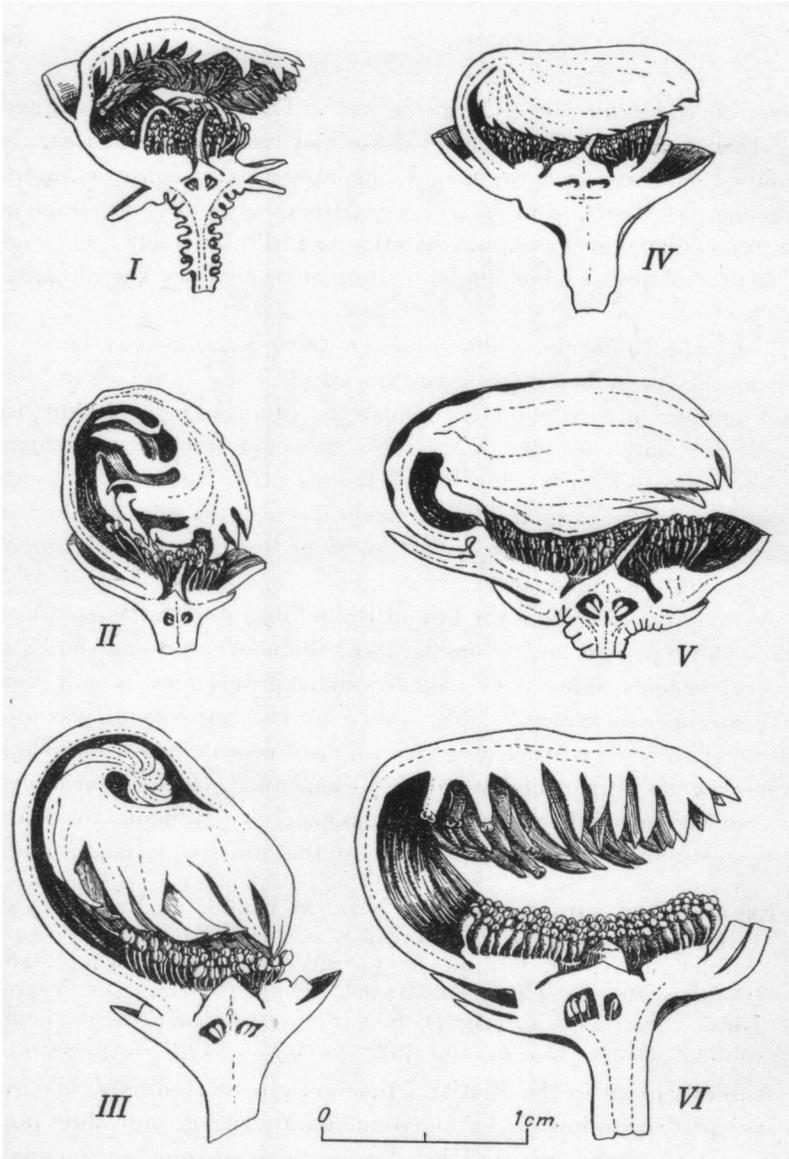


FIG. 9. *Eschweilera* and *Lecythis*; flowers cut lengthwise (petals removed).

- |   |   |
|---|---|
| I <i>E. amara</i> (Aubl.) Ndz.<br>(B.W. 3432).              | IV <i>E. labriculata</i> Eyma<br>(Coll. indig. 115).                      |
| II <i>E. chartacea</i> (Berg) Eyma<br>(Coll. v. Hall 35 a). | V <i>E. corrugata</i> (Poit.) Miers<br>quoad nomen (Coll. v. Hall 35).    |
| III <i>E. collina</i> Eyma<br>(Tree n. 1340).               | VI <i>L. Davisii</i> Sandw. var. <i>gracilipes</i> Eyma (v. Emden s. n.). |

ones, but the dimensions of the latter are much smaller. Its inflorescence has only one flower-bud left, and part of a flower is glued on the sheet by its side, from which no idea about its structure can be gathered. The rust-coloured rhachis is rather warty, which can scarcely be said of the pedicel.

Another sheet, from Miers's herbarium, bears an envelope inscribed "Guiane, Aublet". Its contents consist of:

1. analytical drawings representing among others an ovary cut lengthwise, showing the same warty covering of pedicels and ovary, and a style of the same shape and length as observed in the Surinam specimens. A drawing of the hood seen from beneath is accompanied by the note "all staminiferous".
2. part of an androeceum-hood with the appendages directed towards its base. Though some of its basal appendages are staminiferous, this does not at all apply to the whole hood, nor was this observed in the Surinam material.
3. the basal part of a flower with completely smooth ovary and pedicel. This certainly belongs to another species than the parts mentioned before.

Though the identification of the Surinam plants with the above mentioned Aublet specimen seems sufficiently acceptable, the interpretation of this as his *L. amara* is not beyond doubt. It may appear strange that neither in Aublet's description of *L. amara*, nor on his plate 286 is the warty character of the pedicels and ovary indicated, whereas he mentions them with his *L. idatimon* ("... pedunculi florum breves crassi, rubri, glandulis minimis, albis, conspersi, numerosissimi, ad basim calycis"). The plant in the Br. Museum, however, interpreted as *L. idatimon*, is not identical with the Surinam plants, and is distinguished by the more open reticulation of its leaves, and its whitish branchlets; its rhachis is more warty than that of *L. amara*, but its pedicels seem to be smooth.

The comparative length of the leaves of both specimens also corresponds exactly with that figured on Aublet's plates

286 and 289, which would support Miers's interpretation if they were drawn on the same scale (nearly natural size). The dimensions of the leaves may, however, not be considered a constant difference between the two species, at least the Surinam ones have much smaller leaves than the sheet in the Br. Museum. As for the colour of the flowers, which Aublet gives as yellow (corolla flava) in *L. amara*, and as red (corolla incarnata) in *L. idatimon*, the Surinam specimens correspond most with the former, B.W. 3432 having white flowers, as is also stated for the Fr. Guyana specimens by Sagot ("flores dicuntur albi cum lamina lutea" Sagot in Ann. Sc. nat., 6e sér. XX, 1885, p. 200). The flower-buds of B.W. 3432 are said to be green, those of B.W. 3446 to be red. The fruits of B.W. 3653 (from the same tree as B.W. 3446) agree with those described by Sagot as having a transversely undulate-rugulose outer surface, and are neither identical with those figured by Aublet for his *L. amara*, nor with those figured as *L. idatimon*.

As a whole Sagot's description of *L. amara* appears to have been written largely after the material in the Paris herbarium and rather independently of Aublet and Miers, and so fits the Surinam plants better than the previous ones do. Accepting the probability that Aublet's herbarium contained no other species besides those described in his *Histoire des Plantes de la Guiane française*, it seems not impossible, though not proved, that Aublet, in preparing his book, confounded parts of his two species, and that the leaves of *L. amara* belong to the inflorescence and flowers of *L. idatimon*, and that Miers, by completing his own descriptions with parts of Aublet's, attributed warty pedicels to both (*Cb. amara*: pedicellis tenuibus, corrugatis, . . . ovario . . . cum pedicello toruloso; *Cb. idatimon*: pedicellis calyce longioribus, validis, rubris, lenticellis albis verruculosis). Since it will be well-nigh impossible to prove this presumption unless the flora of the type-localities be much better known, one can best accept Miers's interpretation and

use the name *amara* for plants with very dense reticulate nervation and warty ovary and inflorescence.

*Eschweilera chartacea* (Berg) Eyma, nov. comb.; — *Lecythis chartacea* Berg in *Linnaea* XXVII (1854) p. 450; — *L. chartacea* var. *calyce et axi racemi griseo-puberulis*, Sagot in *Ann. Sc. nat.*, 6e sér. XX. (1885) p. 203; — *Chytroma chartacea* (Berg) Miers in *Trans. Linn. Soc.* XXX (1874) p. 231; — *Lecythis Marawynensis* Berg in *Fl. Bras.* XIV. 1. (1858) p. 489, t. 69; — *Chytroma Marawynensis* (Berg) Miers l.c. p. 245; — *Eschweilera marowynensis* (Berg) Ndz. ap. *Pulle, Enum.* (1906) p. 332. — Fig. 9 (p. 60).

The Surinam plants correspond with *L. chartacea* Berg but for their puberulous inflorescences, in which they correspond with *L. Marawynensis* Berg, but this must be considered to be of minor importance.

The fruit may be described as follows:

Fructus pars infracalycaris longe turbinata vel semiellipsoideo-turbinata, basi saepius contracta vel truncata, 3½ cm alta, zona calycaris usque 3½ cm diametens sepalis persistentibus munita, pars interzonalis cylindrica, 7—8(—15) mm alta, zonam opercularem versus subangustata, operculum subplanum, apiculatum, margine rotundatum.

**Specimina fructifera:**

Guiana batava, Zandery I, arbor n. 4 (B.W. n. 3805, cum fructibus maturis lectus Apr. 1918 [U]; ejusdem arboris n. 3588 lectus Jan. 1918); Sectie O, arbor n. 620 (B.W. n. 1623 lectus Febr. 1916; n. 4526 lectus Jan 1920); Brownsberg, arbor n. 1277 (B.W. n. 6782 lectus Febr. 1925).

*Eschweilera collina* Eyma, n. sp. — Fig. 9 (p. 60), pl. I.

Arbor, circ. 30-metralis, radicibus haud vel vix tabulatis adscendentibus, trunco tereti, laevi, non nisi apice ramificato, ramulis gracilibus. Foliorum petioli circ. 7 mm longi, laminae oblongae vel elliptico-oblongae, minora lanceolatae, longi-

tudine latitudinem 2—3-plo superante, apice longe acuminatae, basi obtusae vel acutae, in petiolos marginatos decurrentes, 8—14 cm longae, coriaceae, glabrae, statu sicco supra olivaceae, subtus pallide brunneae, nervo mediano supra acute prominulo vel prominente, subtus prominente, nervis primariis minoribusque supra prominulis, subtus nonnihil magis quam supra prominulis, reticulatione ultima densa. Inflorescentiae terminales et axillares, racemosae, breves, glabrae; bractee parvae, triangulares, circ. 1 mm longae; pedicelli usque 19 mm longi, graciles, laeves, glabri; sepala triangulari-ovata, usque 3 mm longa, margine ciliolata; petala oblongo-cuneata, inaequalia, 11—17 mm longa, pallide lutea; androecei stamina numerosa, filamentis vix incrassatis, antheris brevibus, galea spiraliter incurvata, parte apicali abrupte inflexa extus echinata; ovarium 4-loculare, extus laeve glabrumque, stylo cylindrico crassissimo brevi, apice subtruncato conico. Fructus ignotus.

Guiana batava, Brownsberg, arbor n. 1340 (van Emden s.n., typus, cum alabastris floribusque lectus mense Octobri anni 1931, in Herb. Rheno-trajectino [Utrecht]); Brownsberg, arbor n. 1319 (van Emden s.n., cum alabastris floribusque lectus mense Octobri anni 1931).

*Eschweilera congestiflora* (R. Ben.) Eyma, nov. comb.;  
— *Lecythis congestiflora* R. Ben. in *Notulae systematicae* III (1915) p. 177.

The fruit may be described as follows:

Fructus maturi pars infracalycaris plano-rotundata, circ. 5 mm alta, zona calycaris circ. 28 mm diametens, sepalis magnis persistentibus adpressis munita, pars interzonalis 20—24 mm alta, cylindrica, supra zonam calycarem dilatata, zonam opercularem circ. 28 mm diametentem versus subangustata, operculum et semina ignota.

Guiana batava, Brownsberg, arbor n. 1287 (B.W. n. 6967, cum fructibus lectus mense Decembri anni 1926 [U]; ejusdem arboris flores sub n. B.W. 6795 lecti).

*Eschweilera corrugata* (Poiteau) Miers in Trans. Linn. Soc. XXX (1874) p. 253, quoad nomen; Pulle, Enum. (1906) p. 332; — *Lecythis corrugata* Poiteau in Mém. Mus. Paris, XIII (1825) p. 145, t. 3; D.C., Prodr. III (1828) p. 292; Miquel in Linnaea XXII (1849) p. 175; Berg in Linnaea XXVII (1854) p. 453; Sagot in Ann. Sc. nat. 6e sér. XX (1885) p. 203; — *Lecythis salebrosa* Berg in Fl. Bras. XIV, 1, (1858) p. 488; — *Chytroma salebrosa* (Berg) Miers, l.c. p. 240; — *Eschweilera salebrosa* (Berg) Ndz. in Engl. u. Prantl, Nat. Pflanzenfam. III, 7 (1898) p. 40; Pulle, Enum. p. 332; — *Chytroma rubriflora* Miers, l.c. p. 241; — *Lecythis venusta* Miers, l.c. p. 214, omnino?; Pulle, Enum. p. 331. — Fig. 9 (p. 60).

Though I did not find Poiteau's type specimen (from Fr. Guyana) in the Paris Herbarium, his plate does not leave any doubt about the identity of this evidently rather common species. A sheet from Poiteau's herbarium at Kew confirms the present interpretation. Probably Miers saw neither this plant nor Poiteau's plate, and so, judging from the rather short descriptions given by D.C., Miquel and Berg, he misinterpreted it so far that he described two specimens of the true *E. corrugata* as a new species *Chytroma rubriflora* (Van Rohr without number [NH] and Sagot 1032 pro parte [NH], both from Fr. Guyana), at the same time identifying as *E. corrugata* some other specimens respectively belonging to his *Lecythis rubicunda* (Martin [NH], probably a duplicate of his own type) and to his *Chytroma amara* (the other part of Sagot 1032 [NH]), the third, a fruit collected by Parker, I did not see.

Sagot, knowing Poiteau's plate, interpreted it in the right way, but not aware of Miers' mistake, he attributed to *Chytroma rubriflora* the characters of *E. amara*, at the same time attaching *Ch. rubriflora* as a variety to *Lec. corrugata*, as shown by the following quotation: "Lec. corrugata... ovarium 4-loculare ... flores subsessiles... Var. pedicello florali longiori, foliis paululo latioribus, Chytroma rubriflora Miers..."

The two species should certainly be kept separate, as is sufficiently proved by the structure of the androeceum-hood (cf. Fig. 9), together with the differences mentioned by Miers.

The annotation "4 loges, corrugata Miers non Poiteau" on the sheet of Sagot 1032 belonging to *E. amara* at Paris, hints at the confusion mentioned above. The identity of *Ch. rubriflora* and *L. corrugata* was also noted by Sandwith on the cover of Sagot 1032 at Kew.

On the other hand *Lecythis salebrosa* Berg does not differ sufficiently from *E. corrugata* to be maintained. This species was founded by Berg on a single specimen, Wullschlaegel 1472 [B] from Surinam "affinis *L. corrugatae* Poit., sed distincta: pedicellis calyce longioribus; sepalis ovatis vel ovato-oblongis, nec rotundatis." The only specimens of *L. corrugata* Berg cited (in *Linnaea* XXVII) were Kappler 1479 ed. Hohenacker, in the Vienna Herbarium, determined by Miquel as *L. Idatima*, but afterwards (in *Linnaea* XXII) placed by Miquel himself in *L. corrugata*, and Poiteau's plant, which latter he probably had not seen himself. When a rather great number of specimens is examined, as the present writer had the opportunity of doing, the two species are found to pass gradually into each other. The part of the androeceum-hood in the envelope on the type-sheet of *L. salebrosa* also seems to be the same as those of *E. corrugata*.

The rather long leaves accorded to *L. salebrosa* probably induced Miers, without having seen the type-specimen, to consider this species related to *Ch. idatimon* (Aubl.) Miers, from which it is easily distinguished by the colour of its leaves.

Hostmann 1302 [fl. K and NH, fr. U, ster. P], included by Miers in his *Lecythis venusta*, should be referred to *E. corrugata*. Its leaves are rather large ( $20 \times 7\frac{1}{2}$  cm) and its pedicels only moderately warty. The type specimen, Schomburgk 286 at Kew (also in the Br. Museum) has the same androeceum-hood as *E. corrugata*, its leaves, shorter and more elliptic than those

of Hostmann 1302, show length-folds like those of *L. rosea*,

I strongly suspect the large fruit, evidently a true *Lecythis*, figured by Miers on his plate 55, and which he referred to *L. venusta* on account of its being labelled by Schomburgk with the same name as his plant, to belong to another species.

*Lecythis rosea* Spruce ap. Berg in Fl. Bras. p. 488, *Chytroma rosea* Miers l.c. p. 242 (type: Spruce 1920 from the Rio Negro between Barra and Barcellos in Hb. Munich) is evidently closely related to *E. corrugata*, if not identical. The peculiar lengthfolds of its leaves, its chief distinguishing character, look more like some abnormality. This view is supported by the fact that they are inconspicuous in part of the sheets labelled Spruce 1920 at Kew and at Paris, whereas they are well developed in other sheets bearing the same number, and moreover the occurrence of similar lines in *L. venusta* supports this view.

Hostmann 1260 [K, NH] cited by Miers under *Lec. rubicunda* Miers is quite another plant than the type-specimen (Martin [NH]), and should be referred to *E. corrugata*, though its flowers are said to be white [K]; its identity with *Ch. rubriflora* was already noticed by Sandwith.

The number of ovary cells proved to be not always the same in *E. corrugata*, though 4 is more common.

**Eschweilera floribunda** Eyma, n. sp. — Plate II.

Arbor. Foliorum petioli circ. 6 mm longi, laminae oblongae vel lanceolatae, longitudine latitudinem  $2\frac{1}{2}$ —3-plo superante, apice acuminatae, basi obtusae vel subacutae, in petiolum decurrentes, 8—16 cm longae, subcoriaceae, glabrae, margine integrae, statu sicco supra olivaceae subtus brunneae, nervo mediano supra prominente vel prominulo subtus expresso, nervis primariis minoribusque supra planis vel prominulis subtus prominentibus vel expressis, reticulatione ultima densa. Inflorescentiae terminales et axillares, paniculatae, rhachi ramisque

griseo-puberulis; pedicelli 4—8 mm longi, griseo-puberuli, laeves; sepala longe triangulari-ovata, 1½—2 mm longa, margine ciliolata, parte basali subpuberula; petala oblonga, obtusa, circ. 8—10 mm longa, albida; androecei stamina numerosa, filamentis non vel vix incrassatis, antheris brevibus, galea spiraliter incurvata, parte apicali abrupte inflexa extus echinata; ovarium 2-loculare, extus laeve, griseo-puberulum, stylo brevi crasso truncato. Fructus ignotus.

Guiana batava, Brownsberg (B.W. n. 6345, typus, cum alabastris floribusque lectus mense Novembri anni 1923, in Herb. Rheno-trajectino [Utrecht]).

*Eschweilera idatimonoides* (Berg) Miers in Trans. Linn. Soc. XXX (1874) p. 252; — *Lecythis idatimonoides* Berg in Fl. Bras. XIV. 1. (1858) p. 496, t. 73.

*Lec. idatimonoides* was described from Wullschlaegel 203, Surinam, "ex. depaup. florif. in hb. Mart." This specimen, in the Brussels Herbarium, has rather small leaves, ± 10 cm l., all detached from the twigs, and slightly different as to the density of the ultimate reticulation. I did not see the fruit described and figured by Berg. The species rather resembles the type-specimens of *Lec. Luschnathii* Berg, *Eschweilera Luschnathii* (Berg) Miers (Luschnath 65, Ilheos, Bahia, Brazil) also at Brussels. The deficiency of the material of *E. idatimonoides* and the lack of recent collections referable to this species make it advisable to range it among those insufficiently known. Its large flowers resemble those of *E. longipes* (Poit.) Miers and *E. odora* (Poepp.) Miers.

*Eschweilera labriculata* Eyma, n. sp. — Fig. 9 (p. 60), pl. III.

Arbor. Foliorum petioli 6—12 mm longi, anguste marginati, laminae oblongo-lanceolatae, variables, longitudine latitudinem 2½—3-plo superante, apice acuminatae, basi obtusae vel rotundatae (vel in Coll. ind. n. 115 acutae), 8—25 cm longae, sub-

coriaceae vel chartaceae, statu sicco supra virides subtus brunneae, margine undulatae vel undulato-crenatae, nervo mediano supra prominulo, subtus expresso, nervis primariis supra in vallulis prominulis, subtus expressis, nervis minoribus supra planis vel prominulis, subtus prominulis vel prominentibus, reticulatione ultima densa. Inflorescentiae axillares et terminales, subbreves, 3—5 cm longae, simplices, vel rarius (in specimine n. 115) elongatae, usque 10 cm longae, et interdum ramosae; rhachis fusco-brunnea, lacerato-squamulosa; bracteoli lanceolato-oblongi, circ. 4 mm longi, decidui; pedicelli circ. 2 mm longi, siccitate brunnei; sepala ovato-oblonga, circ. 6—8 mm longa, siccitate nigra; petala obovato-oblonga; 11—19 mm longa, rubra (?); androecei stamina valde numerosa, filamentis non vel vix incrassatis, antheris brevibus, galea supra ovarium inflexa neque spiraliter incurvata, parte inflexa ubique aequae incrassata, plana, intus appendiculis apice versus directis echinata, galeae basis cupulam stamina cingentem efformans; ovarium 4-loculare, extus verruculoso-rugulosum, siccitate brunneum, stylus digitiformis. Fructus ignotus.

Guiana batava, ad rivum Sara prope Abontjoeman (Collector indigenus n. 287, typus, cum alabastris floribusque lectus mense Majo anni 1910, in Herb. Rheno-trajectino [Utrecht]); in sylvis prope Guyana Goudplacer (Collector indigenus n. 115, cum alabastris floribusque lectus mense Aprili anni 1910); in cacumine collis Brownsberg (B.W. n. 6489, cum floribus lectus mense Martio anni 1924).

*Eschweilera longipes* (Poit.) Miers in Trans. Linnean Soc. London XXX (1874) p. 253; — *Lecythis longipes* Poiteau in Mém. Mus. d'Hist. nat. Paris XIII (1825) p. 144, pl. 2 (= tab. 1) and pl. 7 (= tab. 6) A partim.

Poiteau's figure on pl. 2 (= tab. 1) fairly agrees with the specimens determined as *longipes* by subsequent authors. The androeceum-hood of the sectional drawing fig. 3 on pl. 7 (= tab. 6), however, differs from that of the specimens referred

to *longipes* and, as far as I know, from that of all large-flowered species of *Eschweilera*, in being not spirally coiled inwards, but only bent over the ovary, and accordingly echinate on the inner side instead of on the outer side of its tip. The androeceum-hood figured rather resembles that of a true *Lecythis*, but in this latter genus the ovary is 4-celled and the ovules are supported by long slender funicles. Unless the species has been misinterpreted by Miquel and Berg the sectional drawing must be excluded. Unfortunately the type-specimen of *L. longipes* (Poiteau s.n., Montagne du Mahari, French Guyana) was not found in the Paris Herbarium, while it also seems to be lacking in the Herb. de la Conservatoire at Geneva, though de Candolle saw it in Delessert's herbarium.

In *Linnaea* XXII (1849) p. 175 Miquel determined Kappler 629i as *L. longipes*, which was taken over by Berg in *Linnaea* XXVII (1854) p. 453. I did not see any plant labelled Kappler 629i, but those inscribed Hostmann 629i in Utrecht and Paris, the latter distributed by Hohenacker, may be considered as duplicates. Martin's plant from Fr. Guyana in the British Museum, which Miers thought to be *L. longipes*, and the only specimen cited with his *Eschweilera longipes*, has broader sepals than the Surinam plants and rather long pedicels,  $\pm 3\frac{1}{2}$  cm l., and so approaches Poiteau's figure. The petioles and inflorescence of Martin's plant are black, whereas in those from Surinam they are either blackish, or grayish-velutinous or tawny-velutinous.

The flowers of the Surinam specimens do not fully attain the dimensions of those of Poiteau's, which may be partly due to the dried state of the former, whereas Poiteau made his drawing after the living object. Besides, the Surinam fruits are somewhat more apiculate.

The leaves are said by Poiteau to be "d'un vert foncé mat en dessus, d'un vert clair et luisant en dessous", but those from Surinam as well as for example Sandwith 513 from Br. Guyana are duller and more brownish-grey beneath than above.

*Lecythis Wullschlaegeliana* Berg in Fl. Bras. XIV. 1 (1858) p. 493, (type-specimen: Wullschlaegel 1471, Para distr., Surinam [B]) is certainly identical with the recent Surinam collections, as well as with the plant from British Guyana mentioned above, and its flowers will also probably have been reddish in their fresh state. Miers, l.c. p. 263 included this species in *Eschweilera macrophylla* (Berg) Miers, though *Wullschlaegeliana* is the older name (1858), *macrophylla* having been published in 1859 in the Supplement to the Myrtaceae of the Fl. Bras. I did not see the type-specimen of the latter species (Poiteau in hb. Kunth), but the description in the Fl. Bras. seems to agree. There might be even a bare possibility that it is part of Poiteau's *L. longipes* but for the length of the pedicels which is 18 mm in *L. macrophylla* and 30—36 mm in Poiteau's plant. The plant, collected by Anderson in "Guiana Belgica", in the herbarium of the Linnean Society, probably the same as that cited by Miers with *E. macrophylla*, and the only specimen of that species seen by him, may be best referred to *E. longipes*. It may be well to note that Miers saw neither Wullschlaegel's nor Poiteau's specimen.

*Lecythis pilosa* Poeppig apud Berg in Fl. Bras. XIV. 1. (1858) p. 500 (type-specimen: Poeppig 2669, Ega, Amazonas [dupl. P]) placed by Miers in *Eschweilera*, but not seen by him, closely resembles the Surinam plants, but it has rather thin leaves, with the primary nerves diverging at a rather wide angle. Its flowers are said to be dark violet-purple.

*Eschweilera odora* (Poepp.) Miers in Trans. Linn. Soc. XXX (1874) p. 273; — *Lecythis odora* Poeppig apud Berg in Fl. Bras. XIV. 1. (1858) p. 492; — *Eschweilera pallida* Miers l.c. p. 267; — *Eschweilera matamata* Huber in Bol. Mus. Paraense (Museu Goeldi) VI (1910) pp 195 and 211, nomen.

The duplicate of the type-specimen of *L. odora* in the Paris Herbarium (Poeppig 2754, Ega, Amazonas) is identical with

a plant collected by Guedes near Belem do Pará (Herb. Amaz. Mus. Paraensis 1292, Herb. Jard. Bot. Rio de Janeiro 17315 [U, P]) determined by Huber himself as *E. matamata*, with which it was compared side by side, the only possible difference being the slightly more curved tips of the primary nerves in the latter. No other sheets besides the type have been referred to *odora* by Berg, or by Miers, who did not even see Poeppig's plant. The material distributed by the Jardim Botânico at Rio de Janeiro as *E. matamata* shows a rather wide range of variability as regards the form, dimensions, texture and nervation of the leaves.

The variability of the Surinam plants is as considerable, though not always parallel to that of *E. matamata*, but the inconstancy of the varying characters does not allow their grouping into distinct species. Stahel 95 from the upper Suriname R. is quite identical with Herb. Rio de Janeiro 17315, and Tree n. 508 from Sectie O approaches these specimens, whereas most sheets from Tree n. 105 Sectie O have narrower leaves and larger, thinner, and more glabrous sepals. Both Poeppig 2754 and Herb. Rio 17315 have been collected without fruits, but ripe fruits identical with those from Surinam were distributed with Herb. Rio 17316 from a tree grown in the Botanic Gardens at Pará and originating from between Belem and Bragança, and equally determined by Huber as *E. matamata*. The sheet of this collection in the Utrecht Herbarium shows long, narrow, elastic leaves, with the nervation rather flat above.

The type-specimen of *E. pallida* Miers (Martin s.n., French Guyana [NH]) should likewise be included in *E. odora*.

It may be that *Lec. turbinata* Berg, *Chytroma turbinata* (Berg) Miers, *Eschweilera turbinata* (Berg) Ndz., and *Lec. pachysepala* Spruce ap. Berg, *Eschw. pachysepala* (Spruce) Miers, will also have to be united with *E. odora*. I did not see the type-specimen of *L. turbinata* (Spruce 1167, Barra do Rio Negro) but Spruce 1238 [P] from the same locality and referred to it by Miers

and an unnumbered sheet collected by Spruce [NH] point in that direction. The fruit figured in the Fl. Bras. has a slightly umbonate operculum. Duplicates of the type-specimen of *L. pachysepala* (Spruce 1912, from between Barra and Barcellos) were seen at Paris, Kew, and in the Br. Museum. The latter sheet has rather small leaves; the sheet at Kew is inscribed "peds. red. Cor. creamed or pale sulphur" in Spruce's handwriting.

*E. odora* belongs to a group of habitually very similar species, which makes a sound definition very difficult, especially since *odora* itself, as it is now delimited, shows rather variable characteristics. Consequently a number of species remained which could not be classed with certainty (cf. p. 199). The differences by which *E. odora* can be distinguished from the species referred to *E. longipes*, likewise occurring in Surinam, and with which it may be easily confused, are

*E. odora*

younger branchlets dark to black, finely and regularly striate

primary nerves 11—15 on each side.

inflorescences often with some feeble lateral branches

sepals ovate to suborbicular, 3—4 mm l.

flowers white or creamy to yellow

operculum not umbonate or scarcely so

*E. longipes*

younger branchlets grayish, less regularly striate, often warty lenticellate

primary nerves  $\pm$  9 on each side

inflorescences not branched

sepals ovate-oblong to oblong,  $\pm$  8 (5—10) mm l.

flowers reddish or violet

operculum umbonate

*Eschweilera simiorum* (R. Ben.) Eyma, nov. comb.; —  
*Lecythis simiorum* R. Ben. in *Notulae systematicae* III  
(1915) p. 178.

The unripe fruit may be described as follows:

Fructus immaturi pars infracalycaris rotundata, 10—15 mm alta, zona calycaris circ. 30 mm diametens, sepalis auctis usque 21 mm longis, 18 mm, latis, persistentibus, adpressis munita, pars interzonalis circ. 16 mm alta, cylindrica, supra zonam calycarem dilatata, zonam opercularem versus subangustata, operculum e basi plano longe apiculatum.

Guiana batava, Sectie O, arbor n. 713 (B.W. n. 1665, cum fructibus immaturis lectus mense Februario anni 1916 [U]); ejusdem arboris flores sub n. B.W. 4205 lecti.

The fruits have been much compressed in the drying press, obviously they were not quite mature, as may be also concluded from the presence of the operculum. Probably the mature fruit resembles those of *E. congestiflora* (R. Ben.) Eyma and *E. calyculata* Pittier.

var. *latifolia* Eyma n. var.

A specie differt foliis pro longitudine latioribus, longitudine latitudinem 2—2¼-plo superante, sepalis latioribus, magis rotundatis, nervis 5 conspicuioribus munitis.

Guiana batava, in colli Brownsberg (B.W. n. 6377, typus, cum alabastris floribusque lectus mense Januario anni 1924, in Herb. Rheno-trajectino [Utrecht]); ad Flumen Suriname superius prope Goddo (Stahel n. 121, fl. Jan.).

The flowers of Stahel 121 are said to be reddish, those of B.W. 6377 yellow-white, but probably the latter only refers to the androeceum-hood.

*Eschweilera subglandulosa* (Steud.) Miers in *Trans. Linn Soc.* XXX (1874) p. 266; — *Lecythis subglandulosa* Steud ap. Berg in *Linnaea* XXVII (1854) p. 459.

Fructus pars infracalycaris turbinata, circ. 13—20 mm alta, zona calycaris 28—33 mm diametrens, pars interzonalis cylindrica 8—18 mm alta, operculum turbinatum, apice et margine rotundatum, rarius depressum.

Specimina fructifera:

Guiana batava, ad fl. Marowyne (B.W. n. 4180, lectus mense Novembri anni 1918 [U]); Zandery I, arbor n. 11 (B.W. n. 1574, lectus Jan. 1916, n. 2025, lectus Jun. 1916); Zandery I, arbor n. 1010 (B.W. n. 23, lectus Majo 1911); Sectie O (B.W. n. 2335, lectus Aug. 1916, n. 2337, lectus Aug. 1916); ad fl. Nickerie sup. (B.W. n. 1031, lectus Febr. 1915); ad rivum Kaboeri (B.W. n. 2209, lectus Jun. 1916); Kaboeri, arbor n. 526 (B.W. n. 5958, lectus Aug. 1922); prope Wonotobo (B.W. 2539, lectus Oct. 1916).

*Gustavia augusta* Alm, *Plantae surinamenses* (1775) pp 12, 18, and in Linn. *Amoenitates acad.* VIII (1785) p. 266, t. 5.

*G. augusta*, enlarged by Berg in *Fl. Bras.* XIV. 1. (1858) p. 469, by including in it, as varieties, several somewhat differing plants, was again reduced to its original limits (i.e. *G. augusta* var. *guianensis* Berg) by Miers in *Trans. Linn. Soc.* XXX (1874) p. 176, who referred Berg's other varieties to several other, partly new, species. The revision of the Surinam sheets showed that *G. augusta* may indeed be considered a rather variable species, for example in the development of its calyx-lobes, and so Berg's conception seems preferable to Miers' more restricted one. The corky warts on the inflorescence and flowers of Wullschlaegel 205 [B] (var. *verrucosa* Mart. ap. Berg) may be due to some disease. Berg's plate 55, which Miers referred to his *G. Marcgraaviana*, does not agree with the latter's description of the calyx: calycis limbus brevissimus, integer, undulatim recurvulus, showing four well-developed acuminate calyx-lobes, and so more resembles Berg's var. *calycaris* (*G. calycaris* Miers and *G. laciniosa* Miers), which, however, is said to have rotundate-ovate lobes. Which is the specimen figured cannot be gathered from Berg's descriptions. Alm's figure,

from a plant collected in Surinam by Dalberg, shows a completely smooth calyx rim, as does Poiteau's drawing (as *G. urceolata* Poit.) in Mém. Mus. d'Hist. nat. Paris XIII (1825) pl. 5 = tab. 4, made after the living plant in French Guyana. Whether, as Sagot thinks, *Pirigara tetrapetala* Aubl. (*Griasp Aubletiana* Miers) should be included in *G. augusta*, I cannot say. Cf. Sagot in Ann. Sc. nat. 6e sér. XX, 1885, p. 198 and 214.

*Gustavia hexapetala* (Aubl.) Smith in Rees' Cycl. VXII (1819); — *Pirigara hexapetala* Aubl., Pl. Guian. fr. (1775) I, p. 490, III, pl. 193; — *Gustavia fastuosa* Willd. in L. Sp. Pl. III (1800) p. 847; Berg in Fl. Bras. XIV. 1. (1858) p. 473; Miers in Trans. Linn. Soc. XXX (1874) p. 188; — *Gustavia pterocarpa* Poiteau in Mém. Mus. XIII (1825) p. 158, t. 6, 7; Miers l.c. p. 186.

Notwithstanding Miers's criticism of Berg for confounding *G. fastuosa* and *G. hexapetala* with *G. pterocarpa*, the arguments supporting his opinion seem rather unsatisfactory.

Miers gives their chief distinguishing characters as follows:

*G. fastuosa* (= *P. hexapetala*) should be characterized by:

"... its alternate flowers, their smaller size, the acutely 6-lobed limb of the calyx, the wings of the ovary vanishing at base, and its much smaller smooth greyish fruit, by abortion 4—5-locular, with monospermous cells... petals 6—10 lines long, 4—6 lines broad, fruit 14 lines in diam..."

*G. pterocarpa* should be characterized by:

"... its congested terminal inflorescence, its larger flowers on pedicels 2-bracteolated at base, its ovary with broader, more undulated wings, terminating at their base in a mucronate tooth, and crowned with 5 long sepals carinated within, in its larger whiter petals, in its winged fruit double the size... petals 10—14 lines long, 5—7 lines broad, flower expanded 2—2¾ in. across, pyxidium in an immature state 2½ in. in diam..."

When studying the Guyana materials of the species in question,

the characters mentioned by Miers were found to form transitions independent of each other. A good example is furnished by sheets from the numbered tree 576 Sectie O, which show at the same time solitary axillary flowers and a broadly winged ovary; in several other cases both development and form of the wings were found to vary greatly in the same specimen; in the same fruit some wings may be well developed and others scarcely so. The inflorescence as shown by Aublet's plate, and which agrees with that of Aublet's plant in the British Museum, and that of Poiteau's plate show no fundamental differences. Whether the dimensions of the fruit constitute a sufficient distinguishing character is much to be doubted, those of the flower cannot be used as such.

The two varieties in which Berg subdivided *G. fastuosa* in the Flora Brasiliensis, viz. *angustisepala* and *latisepala*, corresponding resp. with *P. hexapetala* and *G. fastuosa* s.str. and with *G. pterocarpa*, are not retained by Sagot in Ann. Sc. nat., 6e sér. XX (1885) p. 198, nor did Berg use them in his previous paper in Linnaea XXVII (1854) p. 446.

The specific name *fastuosa* Willd., employed by Berg and Sagot for the combined species is invalidated by *hexapetala* Aubl.

**Lecythis Davisii** Sandwith in Kew Bull. 1932, no. 5, p. 213.

var. **gracilipes** Eyma, n. var. — Fig. 9 (p. 60).

A specie differt pedicellis gracilioribus non e basi ipso ovarium versus incrassatis, sepalis magis ellipticis longioribusque, usque 7 mm attingentibus, pedicellis, ovario, sepalisque, nec non ramulis junioribus et nervo mediano dense puberulis, statu sicco fulvis.

Guiana batava, Brownsberg (van Emden n. 10, typus, cum alabastris floribusque lectus mense Octobri anni 1931, in Herb. Rheno-trajectino [Utrecht]).

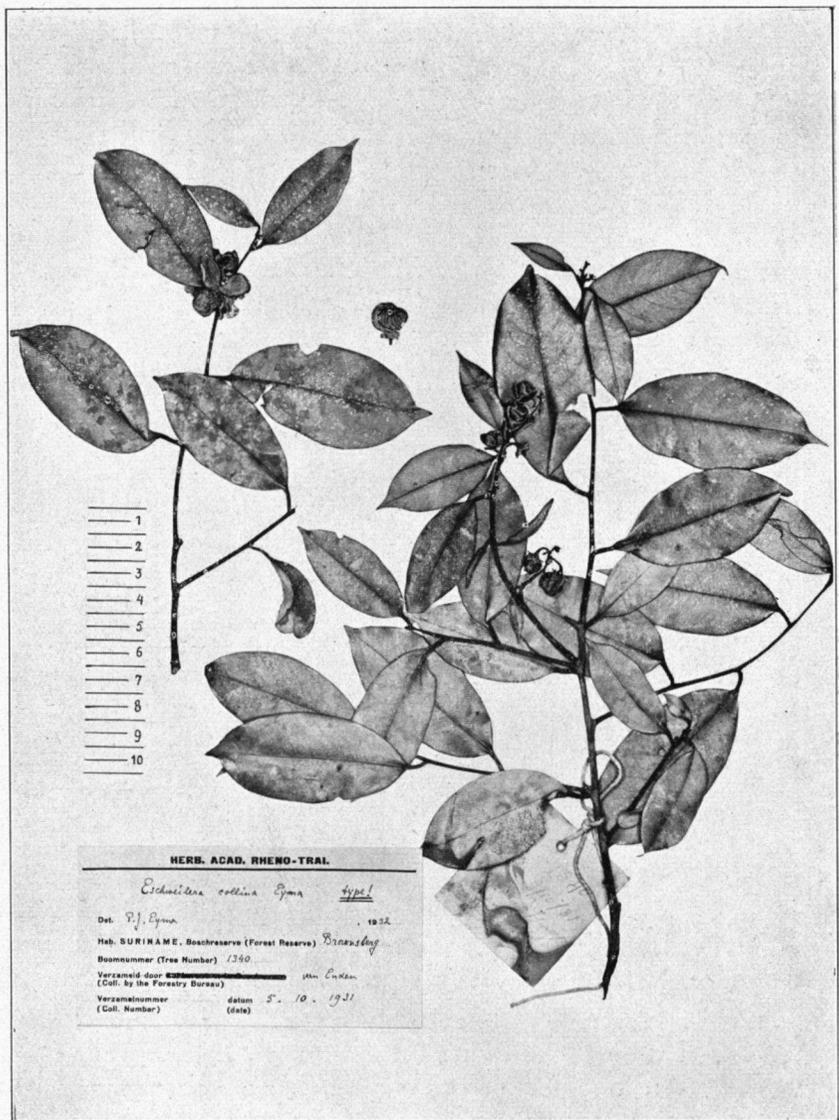
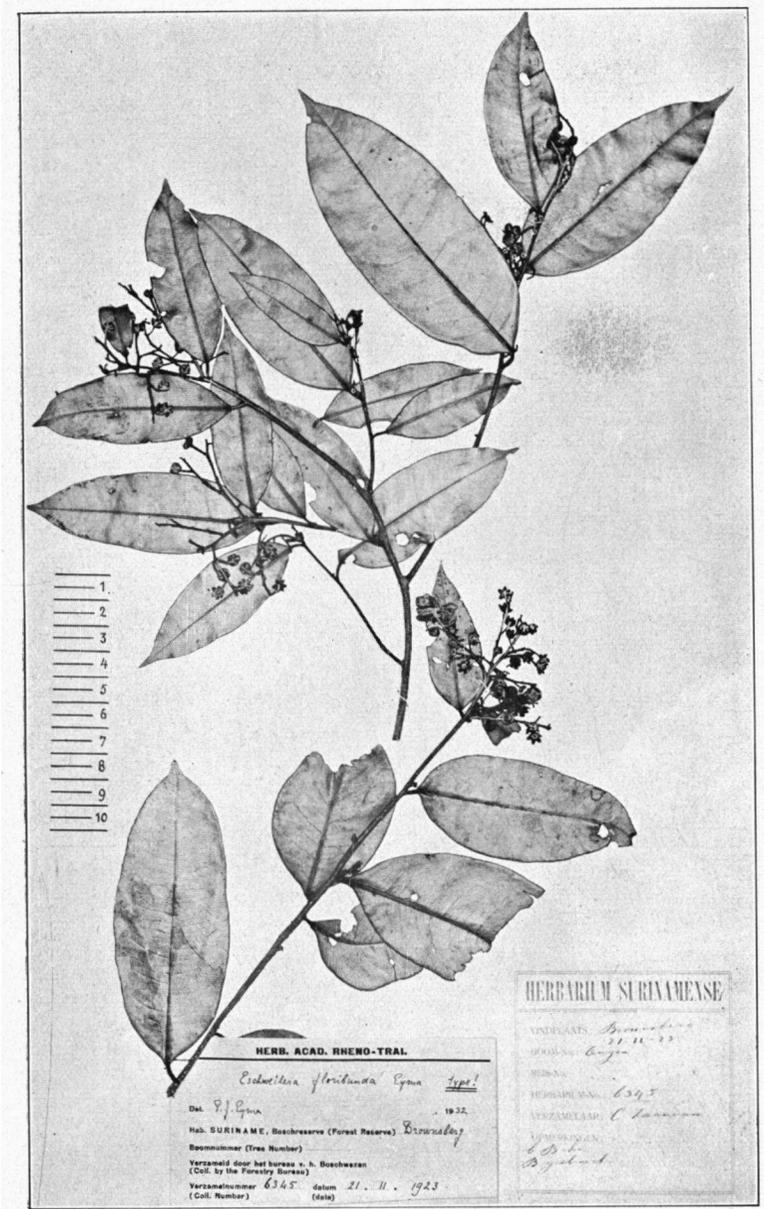


PLATE I. *Eschweilera collina* Eyma (B.B. Tree n. 1340).



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HERB. ACAD. RHENO-TRAL

*Eschweilera floribunda* Eyma type!

Det. P. J. Eyma 1932.  
 Hab. SURINAME, Boschreserve (Forest Reserve) Brownsloeg  
 Boomnummer (Tree Number)  
 Verzameld door het Bureau v. h. Boschwezen  
 (Coll. by the Forestry Bureau)  
 Verzamelnummer 6345 datum 21. 11. 1923  
 (Coll. Number) (date)

HERBARIUM SURINAMENSE

VERZAMELT: *Brownsloeg*  
 21. 11. 23  
 BOOMNOMMER: *6345*  
 HERBARIUM NO.: *6345*  
 VERZAMELDER: *C. Lammens*  
 VERZAMELDE: *B. J. Eyma*

PLATE II. *Eschweilera floribunda* Eyma (B.W. 6345).

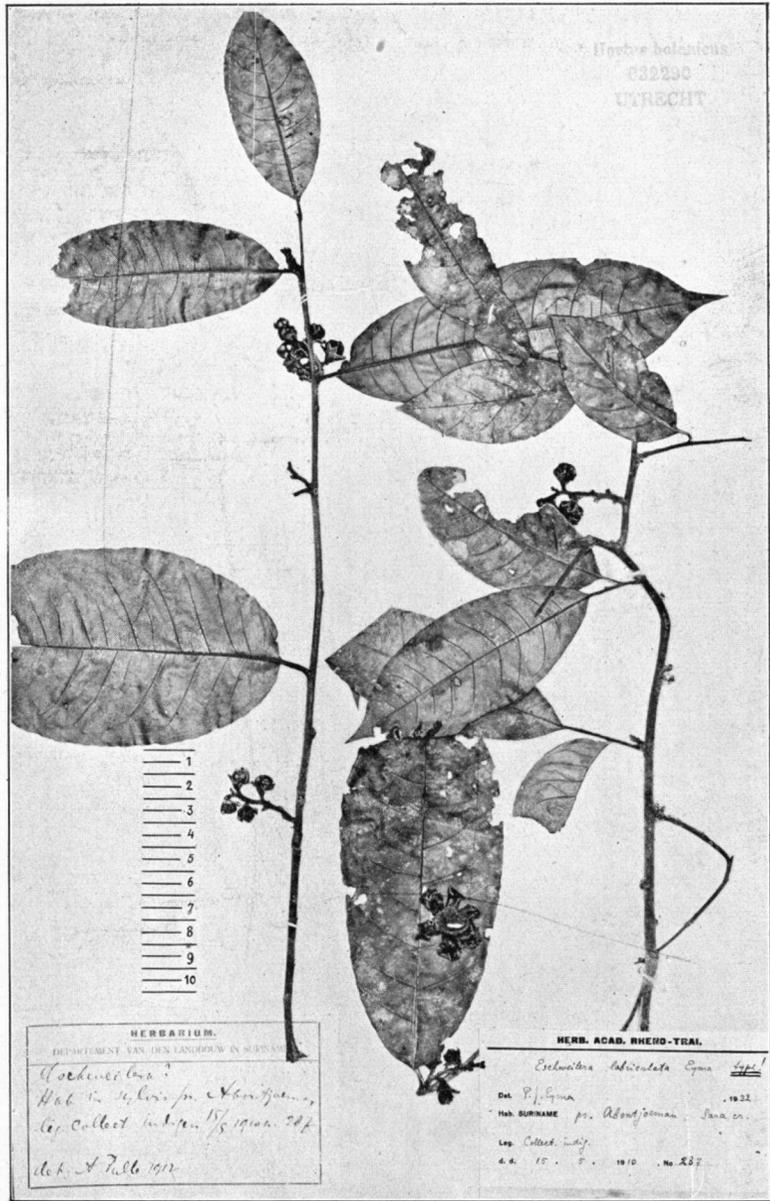


PLATE III. *Eschweilera labriculata* Eyma (Coll. indig. 287).