

REINWARDTIA

BEING A CONTINUATION OF THE

BULLETIN DU JARDIN BOTANIQUE DE BUITENZORG
(*BULLETIN OF THE BOTANIC GARDENS, BUITENZORG*)

EDITORS

ANWARI DILMY
(Herbarium Bogoriense)

AND

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(Flora Malesiana)

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A REVISION OF MALAYSIAN BAUHINIEAE

H. C. D. DE WIT*

Scio multos timere ne, genera multiplicando, memoria studentum gravetur: ego autem magis timeo ne nimium coarctando confunduntur: ambiguique, imo erronei fiant characteres tam Generum, quam Classium, per quod scientia Botanica evertetur. Est modus in rebus.—LOUREIRO (1790)

SUMMARY

This revision deals with the tribes Bauhinieae (*Caesalpinaceae*) as occurring in Malaysia. The tribe includes the genera *Bauhinia* L. s. str., *Bracteolanthus* de Wit gen. nov., *Gigasiphon* Drake del Cast., *Lasiobema* (Korth.) Miq., *Lysiphyllum* (Benth.) de Wit gen. & stat. nov., *Phanera* Lour., and *Ptilostigma* Hochst. *Bauhinia* is reduced to the original Linnean delimitation; 2 species are treated (inclusive of a number of varieties); 2 species are reduced to the rank of varieties and 3 new varieties are described, accounting for 3 new varietal combinations and 3 new varietal names. *Bracteolanthus* contains a single species for which a new combination is proposed. *Gigasiphon* is represented by 3 species; 3 new specific combinations are made. *Lasiobema* is represented by 5 species; in this genus 1 new species is described, 4 new combinations and 1 new varietal combination are proposed, and a new but insufficiently represented species is recorded. Some new combinations for extra-Malaysian species are also proposed. Of *Lysiphyllum* 2 species are treated; 2 new combinations and some new combinations for extra-Malaysian species were necessary. *Phanera* is by far the largest genus: 44 species, many of which are divided into subspecies and/or varieties. The genus is subdivided into three subgenera, *Phanera*, *Biporina* de Wit, and *Austrocercis* de Wit. Of these, subgenus *Phanera*, in its turn, contains 3 sections, all new, viz *Phanerosiphon*, *Meganthera*, and *Micranthera*. Subgenus *Biporina* comprises the 3 new sections *Bifoliola*, *Palmatifolia*, and *Cinnamomifolia*. Subgenus *Austrocercis* consists of a single species. The recognition of *Phanera* as a genus, as well as the description of new taxa and the revaluation of some previously described ones made necessary a large number of new names and new combinations.

The last genus, *Ptilostigma*, is represented by 1 variety of the only species occurring in Malaysia.

Keys are given to all taxa.

* Formerly Botanist, Flora Malesiana Foundation.

GENERAL PART

The present paper is preliminary to a revision of the Caesalpinaceae now being prepared for the "Flora Malesiana." It embodies the outcome of a study of specimens kindly put at my disposal by the Directors of the Herbaria at Berkeley, Bogor, the British Museum, Brussels, Copenhagen, Florence, Geneva, Harvard University (Arnold Arboretum), Kew, Leyden, Michigan, Munich, Paris, Singapore, Stockholm, and Utrecht. I gratefully acknowledge my indebtedness.

Bentham (*in* Hook. J. Bot. 2: 97. 1840), though at first inclined to divide the genus *Bauhinia* s. ampl. into several genera, in 1865 (*in* B. & H., Gen. Pl. 1: 575) summarized his opinion as follows: "Genus potius habitu quam characteribus definitis limitatum nunc Sclerolobis nunc Amherstieis accedit . . . Inter sectiones sequentes, plurimae ab auctoribus nonnullis pro generibus propriis sumuntur, sed genus magis commode in integrum restituendum videtur, *Cassiae* et *Caesalpiniae* analogum." *Bauhinia* L. thus came in current usage in a much wider sense than Linnaeus originally intended. Some infrageneric taxa were recognized. Bentham's conclusion, the wide generic delimitation of *Bauhinia*, was generally followed, e.g. by Taubert (*in* Engl. & Pr., Nat. PflFam. 3, 3: 147-153. 1891).

There exists a close, reticulate affinity among the members of *Bauhinia* s. ampl.; distantly related species, when described for the first time, were easily placed within its capacious bounds, and their position, as part of a closely knit, natural taxon, did not militate against a sound taxonomical intuition.

On the other hand, very few taxonomists had a clear concept of the full range of species that came to be held within this single genus. When I began to study Malaysian *Bauhinia*, the first fact to be considered was that Urban (*in* Ber. dtsh. bot. Ges. 3: 81-101. 1885) distinguished eight different floral diagrams in the genus, and that at present some more must be added if *Bauhinia* were maintained in its present circumscription. Further, I was confronted with species so widely different as *B. acuminata*, *B. dolichocalyx*, *B. williamsii*, *B. diptera*, and *B. scandens*. Custom required that they should be arranged as members of a single genus. No argument for maintaining *Bauhinia* s. ampl. could be found, however, in that, as a genus, it was well demarcated from other genera (Bentham pointed that out already) or that for practical reasons it ought to be preserved as a "complex genus." In "Genera Plantarum," Bentham arranged *Bauhinia* with two very small genera as representing the tribe Bauhinieae, which implies that its limits were considered to be largely of tribal significance.

I noticed that some characteristics that were found valuable as distinctions among various genera in Caesalpiniaceae served as sectional characteristics in *Bauhinia s. ampl.*

When emended to some degree, the sections in *Bauhinia s. ampl.* recognized by Benthham and his followers could often be equally well delimited as genera as could *Bauhinia s. ampl.*, which justified, after all, their having been originally proposed as a genus.

Benthham arrived at his conclusion after twenty-five years of unequalled experience and so it was with some diffidence that I resolved, after only three years of considering the problem, that a change was necessary and that *Bauhinia s. ampl.* ought to be reduced to what we may believe to be in close agreement with the Linnean conception. This made necessary the resurrection of genera usually referred to the synonymy of *Bauhinia* and the description of a new genus. Nevertheless, the data derived from the examination and comparison of numerous specimens, and species which had been discovered or had become better known since Benthham's work, left no other choice. The genera I recognize here are, I believe, very natural groups, repeatedly linked, but well distinguished by certain combinations of characters.

General surveys after Benthham's were made by Baillon (1870) and by Taubert (1891). Taubert followed Benthham as regards the generic delimitation of *Bauhinia*. He subdivided *Bauhinia s. ampl.* first of all on account of the number of fertile stamens. This resulted e.g. in placing *Bauhinia purpurea* L. in the section *Phanera*. The same happened to *B. variegata* L. (Taubert, *op. cit.*, p. 151), but the latter example had better be treated as an error because, according to Taubert's key, *B. variegata* could never be referred to *Phanera*, which according to Taubert has four or three fertile stamens, whereas *B. variegata* has five. It seems also to me that the natural affinity of *B. purpurea* to the other species of *Bauhinia* is so clearly marked that its proper place in the system is hardly open to discussion and, consequently, a system which implies its classification in *Phanera* is untenable.

Nevertheless, in relation with other characters, the number of fertile stamens carries weight but it is not the sole guiding principle. Taubert attached little or no importance to the characters of the receptaculum and only Prun's excellent study of 1897 [*in* J. As. Soc. Bengal 66 (2): 179 seq.] stressed the valuable conclusions which might be derived from these.

Taubert stated his reason for not allowing generic rank to many of the genera he treated as sections of *Bauhinia s. ampl.* in words to nearly

the same effect as Bentham's: "da es jedoch kein einziges Merkmal gibt, welches eine generische Abtrennung derselben rechtfertigt, muss die Gattung . . . als ein Ganzes beibehalten werden."

If this view were correct, then tribes composed of infratribal taxa which are closely and reticulately related can never be subdivided into genera. In such tribes no genus can be designated which is different from the remainder of the tribe by a solitary or unique and "independent" character that occurs nowhere else in the tribe. The very nature of reticulate affinity is contrary to a method for subdivision based on single characters, and to apply this method would result in the opposite of what was intended: if single or unrelated characters were to govern the delimitation of reticulately connected genera, an unnatural system must result.

I am also opposed to Taubert's systematy because I fail to understand why the presence or absence of an unrelated morphological character would be a clearer indication of the degree of natural relationship than the correlation or combined occurrence of groups of characters; taxa characterized by sets of characters are as a rule more natural than those founded on an isolated "key-character," however "practical" the application of a single, easily observed "key-character" may be.

Realizing that an effective method to subdivide the Bauhinieae could be devised only by a careful evaluation of the taxonomic weight of characters, singly and in correlation, followed by segregation expressing the natural degree of relationship, I have arrived at a systematy of the tribe to which the generic delimitation of a number of earlier authors could be applied, although a few alterations, extensions or restrictions, proved to be advisable.

A census of the tribe Bauhinieae in which the morphological characters and distribution of the genera are listed and compared may follow here. It is to be noted that *Bauhinia s. ampl.* is considered only as regards its Malaysian representatives.

Cercis L.—Trees or shrubs, without tendrils. Leaves entire or more or less emarginate. Intrastipular trichomes numerous, well developed. Stipules blunt. Flowers pseudo-papilionaceous, fasciated on very short racemes. Receptacle widely cup-shaped, unilaterally inflated. Calyx imbricate, shallowly dentate. Fertile stamens 10, free. Anthers elliptic, small, opening by a length-slit. Ovarial stipe free, obliquely arising from the flat receptacle. Stigma small. Pods semi-dehiscent, dorsally semi-alate. Seeds albuminous. Hilum circular. Funicle without branches.

Extra-Malaysian: temperate zone of the northern hemisphere.

Bandeiraea Welw. ex B. & H.—Trees or lianas, without tendrils. Leaves entire. Intrastipular trichomes small or absent. Stipules small,

acute. Flowers in aggregate, pyramidal racemes. Receptacle tubular, gradually widening towards the mouth. Calyx imbricate, shallowly dentate. Fertile stamens 10, free. Anthers elliptic, small, opening by a length-slit. Ovarial stipe connate with wall of receptacle. Stigma small. Pods inflated. Seeds exalbuminous.

Extra-Malaysian: tropical Africa.

Pellegrin (*in* Mém. Inst. Et. centrafr. 1: 135. 1948) proposed *Bandeiraea* as a conserved name against *Griffonia* Baill. (cf. Macbride *in* Contr. Gray Herb. II No. 59: 21. 1919), which proposal is supported here.

1. *Lysiphyllum* (Benth.) de Wit.—Shrubs or climbers, with tendrils. Leaves consisting of two free leaflets. Intrastipular trichomes minute, few. Stipules blunt. Flowers in corymbose racemes. Receptacle narrow, tubular. Calyx lobed from the receptacle; sepals coherent in lobes. Fertile stamens 10. Anthers elliptic, opening by a length-slit. Ovarial stipe connate with wall of receptacle. Style slender. Stigma peltate. Pods indehiscent. Seeds albuminous.

A single Malaysian species.

It is found only on coral rocks in the vicinity of the sea (nearly always on small islands) and forms a link between the Australian and South-eastern Asiatic continental species. The genus seems to be more primitive than *Phanera* and *Bauhinia s. str.* and is, in my opinion, closely related to ancestral taxa of Bauhinieae.

2. *Gigasiphon* Drake del Cast.—Trees or shrubs without tendrils. Leaves entire. Intrastipular trichomes few, small. Stipules acute. Flowers few, in short racemes. Receptacle wide, very long. Sepals free to the receptacle; sepals (finally) free, strap-shaped, provided with an apical nectary. Fertile stamens 10. Anthers large, narrow, opening by a length-slit. Ovarial stipe connate with wall of receptacle; body slender. Style slender. Stigma small. Pods dehiscent. Seeds (always?) exalbuminous.

East Africa, Madagascar, the Philippines, Timor, and New Guinea.

This genus with its large flowers, regularly developed stamens, peculiar bud-tip and nectaries in the apex of the sepals, and exceptional receptacle, may be seen as of great age and primitive, probably related to ancestral taxa of Bauhinieae. It is to be noted that the leaf shows no apparent connection with the bilobed (or 1-jugate) leaf commonly found in Bauhinieae.

3. *Piliostigma* Hochst.—Trees or shrubs, without tendrils. Leaves bilobed. Intrastipular trichomes small (in Malaysia) or large (in Africa), of equal size. Stipules acute. Flowers many, dioecious, in aggregate, depressed racemes. Receptacle small, turbinate. Calyx only in upper half dentate or lobed. Fertile stamens 10 (or absent). Anthers broad, opening by a length-slit. Ovarial stipe free. Style absent or very nearly so, thick. Stigma large, peltate. Pods indehiscent. Seeds albuminous.

Tropical Africa and Asia. In Malaysia a single species, represented by a variety.

The floral characters show some approach to *Bandeiraea*. Its manner of distribution is similar to that of some species of *Bauhinia* s. str.

4. *Bracteolanthus* de Wit.—Lianas, with tendrils. Leaf consisting of two free leaflets. Intrastipular trichomes absent. Stipules round-topped. Flower in long, narrow (pendent?) racemes. Receptacle wide, turbinate. Calyx lobed in the upper half. Fertile stamens 6—8. Anthers broad, opening by a length-slit. Ovarial stipe free. Style long. Stigma small. Pods dehiscent.

Endemic in Borneo. Monotypic.

5. *Bauhinia* L. s. str.—Trees or shrubs, without tendrils. Leaves bilobed. Intrastipular trichomes well developed, one increased and, in South American species, often spinescent. Stipules acute. Flowers less than a dozen, in short racemes. Receptacle present. Calyx spathaceous. Fertile stamens 10—1; staminodes free or connate. Anthers narrow, opening by a length-slit. Ovary slender; stipe free or partly so. Style slender. Pods dehiscent. Seeds albuminous or not. Hilum oblong. Funicular branches long or short.

Tropical America, Africa, and the south-eastern Asiatic continent. In Malaysia a few species.

Though not the most primitive genus, apparently of considerable antiquity. One indigenous species in Malaysia is the link with *Phanera*. The relations to the South-eastern Asiatic species observed in Malaysian taxa suggest that in Malaysia *Bauhinia* is a relict genus of which either two or three species have survived or were re-introduced through human agency, possibly both.

6. *Lasiodema* (Korth.) Miq.—Lianas, with tendrils. Leaves entire bilobed. Intrastipular trichomes few, minute glandlets. Stipules acutish. Flowers numerous, in slender, elongate racemes. Receptacle absent or nearly so, often swollen (and merged with the swollen bases of the stamens) to a disc. Calyx truncate or lobed. Fertile stamens 3. Anthers elliptic, opening by a length-slit. Ovary broad, on a free stipe. Style slender. Stigma small. Pod dehiscent. Seeds few, albuminous or not.

South-eastern continental Asia and Japan. In Malaysia few species.

A somewhat heterogeneous taxon which may require further division.

7. *Phanera* Lour.—Climbers or stragglers, with or, possibly very rarely without, tendrils. Leaves bilobed or entire or consisting of two free leaflets. Intrastipular trichomes absent or very nearly so. Stipules acute or rounded. Flowers few or numerous, in elongate or corymbose racemes. Receptacle tubular, usually well developed. Sepals free to the receptacle, some connate or all free. Fertile stamens 3 (rarely 2). Anthers

oblong and opening by a length-slit or broad and opening by a central pore. Ovarial stipe connate with wall of receptacle. Style slender or thick. Stigma large, peltate, rarely small. Pods dehiscent. Seeds albuminous. Hilum oblong. Funicular branches long or short.

Tropical south-eastern Asia and Africa; in Malaysia as far as New Guinea.

In the tribe of Bauhinieae, *Phanera* is to be seen as the most recent taxon.

Its area of distribution is clearly marked and without gaps; its species, many of which comprise one or more varieties, are closely related. It may be significant that these varieties are morphologically easily distinguishable and yet so close that they cannot well be accepted as subspecies although they have, as a rule, limited and exclusive areas of distribution. If they should not be seen as incipient new species, I think that their frequent occurrence is connected with the age of the specific populations which, being young, are still full of potentialities. Even in case of island distribution of the species, the infraspecific taxa, or partial populations, have not (yet) grown apart to such an extent that subspecific rank seems warranted. This view is in agreement with the close affinities among the species of *Phanera* and the coherent, limited distribution of the genus.

It is also a striking fact that in *Phanera* several series of parallel segregation can be traced, showing species segregation along similar lines.

Finally, if *Phanera* is the most recent genus in Bauhinieae, it is likely to show a number of derived characters but few extreme specializations. Actually, it is nearly entirely composed of climbers (in the rare cases that a more or less shrubby habit occurs, a closer affinity to older genera becomes apparent), and one of the most important characters for the large majority of species is the presence of three fertile stamens always accompanied by a number of staminodes. Nearly always the leaf shows traces of the bifoliolate ancestry of the tribe. In a cultivated extra-Malaysian species with nearly free leaflets, *Ph. corymbosa* (Roxb.) Benth., the funicular branches which run along the circumference of the seed, are frilled and most developed among all species of Bauhinieae I have been able to examine this character. This may be in accordance with the exceptional and primitive character of its leaf, as in the tribe the leaf is normally less than half bifid or entire. This correlation, then, would support my views concerning the course of phylogeny in Bauhinieae and in *Phanera*. There is a single species in *Phanera* with entirely free leaflets (*Ph. foraminifera*) of which the seeds are still unknown. It would be interesting to see whether a similar arilloid growth also occurs in this case.

SPECIAL PART*

Tribus Bauhinieae DC.

Tribus Bauhinieae De Candolle, Mém. XIII Lég. 470. 1825; Vogel in Linnaea 13: 297. 1839; Benth. in Hook. J. Bot. 2: 74. 1840; in B. & H., Gen. Pl. 1: 575. 1865; F. Muell. in J. Linn. Soc. 9: 345. 1867; Baill. in Adansonia 9: 222. 1870; Hist. Pl. 2: 116. 1870; Urban in Ber. dtsh. bot. Ges. 3: 81. 1885; Taubert in Engl. & Pr., Nat. Pflfam. 3, 3: 146. f. 38. 1891; Prain in J. As. Soc. Bengal 66 (2): 175. 1897; Gagnep. in Fl. gén. Indo-Chine 2: 127. 1913; Ridley, Fl. Mal. Pen. 1: 624. 1922; van der Pijl in Acta bot. neerl. 1: 287. 1962.

Leaves alternate, simple, bilobed or consisting of a single pair of leaflets; in bilobed leaves the midrib exerted into the apical sinus as a slender, caducous mucro. Primary nerves palmately arranged. Covered by the stipule and emerging along its insertion, occur one or more rows of minute, subulate, excrescences ("trichomes"), which are largest in *Bauhinia* (though in Malaysia never spinescent), reduced to minute glandlets in *Phanera*, and absent in *Piliostigma*.

Tendrils, if present, compressed, circinate, simple. Inflorescence racemose, simple or aggregate. Sepals narrowly imbricate or valvate, free or coherent. Petals 5. Perfect stamens 10—1, free or shortly connate; staminodes always present if less than 10 stamens are perfect. Anthers dorsifix, opening lengthwise of by a central pore. Ovary stiped; stipe adnate to the anterior wall of the receptacle or free. Pods narrow, strap-shaped or oblong, usually dehiscent.

Trees, shrubs, or climbers.

DISTRIBUTION.—Circumtropical, a few species in the subtropics. In Malaysia 7 genera.

The type genus is *Bauhinia* L. s. str. The climbing Bauhinieae often have peculiarly sinuated stems ("monkey ladders") and a complicated "anomalous secondary thickening" (cf. Taubert, *op. cit.* pp. 80-81). In erect tree-like Bauhinieae tendrils are absent and the stipules are narrow, linear, and acute; tendrilled species (or genera) have, with only very few exceptions, round-topped stipules.

When dissecting buds for identification purposes, it should be kept in mind that, during anthesis, several organs may increase in length or size, in particular the claw and blade of the petal, the filaments of fertile stamens, the ovarial stipe and the style. In *Lysiphyllum binatum* (Blanco) de Wit the stipe and style grow several centimetres in few days after the petals are shed; in *Gigasiphon amplum* (Spanoghe) de Wit the receptacle multiplies its length just before the flower opens; and there are other examples.

* In the present paper some species have been described which are cultivated in Malaysia to a limited extent and are of some promise as immigrants. These were not always entered into the keys.

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CONTENTS

	Page
ADELBERT, A. G. L.: Notes in the flora of Java—VII	145-155
ARÉNES, J.: Florae Malesianae precursores—VI. Malpighiaceae malesianae novae	67- 74
BREMEKAMP, C. E. B.: A revision of the Malaysian Nelsonieae (Scrophulariaceae)	157-261
DILMY, A.: A new species of <i>Anisoptera</i> (Dipterocarpaceae). . .	347-349
DONK, M. A.: The generic names proposed for Hymenomycetes —IV. Boletaceae	275-313
———: Notes on resupinate Hymenomycetes—II. The tulas- nelloid fungi	363-379
HANSFORD, C. G.: Meliolales from Indonesia	75-112
———: Some Microthyriales and other fungi from Indonesia. . .	113-144
HOLTUM, R. E.: Some additional species of <i>Heterogonium</i>	269-274
JACOBS, M.: The section <i>Clemensia</i> of <i>Chisocheton</i> (Meliaceae) . .	269-274
KERN, J. H.: Notes on Malaysian Cyperaceae—II.	27- 66
KOSTERMANS, A. J. G. H.: New and critical Malaysian plants—II. . .	1- 25
SCOTT, A. M. & PRESCOTT, G. W.: Notes on Indonesian fresh- water algae—I.	351-362
SLOOTEN, D. F. VAN: Sertulum Dipterocarpacearum Malayensium —VI.	315-346
WIT, H. C. D. DE: A revision of Malaysian Bauhinieae	381-539

In the descriptions the measurements of the floral parts apply to fully developed, open (dried) flowers. The "bud" is understood here as the upper part or "limb," without the "calyx-tube" or receptacle. Reduced stamens are poorly developed stamens bearing shrunken anthers; staminodes is the term used for merely small filaments. In many herbarium specimens the pedicels appear to be twisted. Whether this is due to the drying process or to a torsion during anthesis remains to be investigated.

In most species of *Phanera*, at the final stage of growth of the flower-bud and during anthesis, the upper half of the pedicel increases much more, often even many times more, in length than the lower half; this point is to be considered when judging the position of the bracteoles, which has been described here in its final development.

It will be observed that infraspecific taxa are delimited in this revision by descriptions of greatly different length; many varieties have a considerably longer description than is customary. I found it desirable to draft descriptions for the infraspecific taxa which were, first of all, suitable to outline the taxon against, and to separate it from, its allies and though this was sometimes possible in a few lines it often needed many. Species are to be compared inter se and so the specific descriptions need a fixed pattern of comparable data, which results in more or less equally long descriptions. In this tribe, however, where many species are composed of several isolated or island populations and are yet closely related, the infraspecific taxa are not infrequently only recognized after some experience and I have thought it useful to assist the student by supplying descriptions of such a nature as may be believed to be most helpful in each particular case.

ARTIFICIAL KEY TO THE MALAYSIAN GENERA OF BAUHINIEAE

1. Leaf consisting of two free leaflets.
 2. Stamens 10, all or the majority fertile.
 3. Receptacle short, turbinate. Inflorescence a long slender raceme. Bracteoles large, placed on top of pedicel. *Bracteolanthus*, p. 415
 3. Receptacle tubular. Inflorescence more or less corymbose. Bracteoles minute, placed at middle of pedicel. *Lysiphyllum*, p. 431
 2. Fertile stamens 3. Cf. *Phanera* subgen. *Biporina*, p. 490
1. Leaf entire or bilobed.
 4. Fertile stamens 10 (or 9) or 0. Tendrils absent.
 5. Leaves entire. *Gigasiphon*, p. 418
 5. Leaves bilobed.
 6. Calyx spathaceous. Buds fusiform, crested. Style slender. Stigma small. *Bauhinia*, p. 390
 6. Calyx lobed or dentate. Buds ellipsoid, top rounded. Style more or less absent, thick. Stigma large. *Ptilostigma*, p. 530

4. Fertile stamens 3, 5, or 1 (very rarely 2).
7. Buds spindle-shaped to oblong-ellipsoid, winged or prominently ribbed at the apex, rarely rounded. Sepals narrowly strap-shaped, remaining wholly or partly coherent (calyx spathaceous). Tendrils absent. . . . *Bauhinia*, p. 390
7. Buds globular to oblong-ellipsoid, never winged at the apex. Sepals strap-shaped, finally free, or minute and only the tips free, or coherent in 2—4 lobes. Calyx never spathaceous. Tendrils present or, very rarely, absent.
8. Disc swollen. Flowers small, in elongate, narrow racemes. *Lasiobema*, p. 422
8. Disc not swollen.
9. Calyx truncate, the tips of the connate sepals just emerging from the margin. *Phanera*, p. 435
9. Calyx consisting of 5, ultimately free, strap-shaped sepals or of 2—4 lobes (each representing one or more sepals), and split to mouth of receptacle. *Lasiobema*, p. 422

BAUHINIA L. s. str.

Bauhinia (Plumier, Gen. Pl. 13. 1703; Linnaeus, Hort. Cliff. 156-157. 1737; Gen. Pl., Ed. 1., 126. 1737; Ed. 2., 178. 1742; Ed. 5. 177. 1754; Sp. Pl. 374. 1759; Pers., Syn. Pl. 1: 454-455. 1805; Kunth in Ann. Sci. nat. 1: 83-86. 1824; DC., Prodr. 2: 512. 1825; Wight & Arn., Prodr. Fl. Pen. Ind. or. 294. 1834; Korth. in Verh. nat. Gesch., Bot. 83. 1841; von Ettingshausen in S. B. Akad. Wiss. Wien, Math.-nat. Cl. 12: 657 pl. 22. 1854; Miq., Fl. Ind. bat. 1 (1): 74. 1855, pro parte; Benth. in B. & H., Gen. Pl. 1: 575. 1865; Bor & Raizada in J. Bombay nat. Hist. Soc. 42: 1-12. 1940. — *Pauletia* Cav., Ic. 5: 5 pls. 409, 410. 1799; Korth. in Verh. nat. Gesch., Bot. 77. 1841. — *Bauhinia* sect. *Pauletia* (Cav.) Benth. in B. & H., Gen. Pl. 1: 575. 1865; Taubert in Engl. & Pr., Nat. Pflfam. 3, 3: 149. 1891. — *Casparia* Kunth in Ann. Sci. nat. 1: 83-85. 1824 (*Casparia* of authors). — *Bauhinia* sect. *Casparia* (Kunth) Benth. in B. & H., Gen. Pl. 1: 575. 1865; Taubert in Engl. & Pr., Nat. Pflfam. 3, 3: 151. 1891.

Shrubs or small trees, without tendrils, rarely stragglers, never climbers. Leaves bilobed. Intrastipular trichomes well-developed, the one nearest to the petiole often increased to a subulate, spreading excrescence, but in Asiatic species never spinescent. Stipules linear or narrowly triangular, acute. Flowers usually large, not numerous, in (short) racemes, on short pedicels.

Buds fusiform or oblong-ellipsoid, never spherical. Receptacle turbinate or tubular, short or long, never dilated at the base. Bracteoles usually with intrabracteolar trichomes. Sepals linear, the majority coherent laterally or at least coherent in the upper part (calyx spathaceous). Stamens 1—10 perfect. Filaments free or (shortly) connate, those of the inner whorl shorter or about equally long, never longer and often only present as staminodes. Anthers narrow, opening by a length-slit. Ovary long-stiped, slender, with a slender style. Stigma small. Flowers usually large, not numerous, in (short) racemes on short pedicels. Pods narrowly oblong to strap-shaped, dehiscent, septate or not, containing half a dozen seeds or more. Seeds albuminous or exalbuminous, not notched at the hilum. Funicle short, small.

TYPE SPECIES.—*Bauhinia divaricata* L.

DISTRIBUTION.—Tropical America, Africa and continental Asia, two species certainly extending into Malaysia.

USES.—Ornamental garden shrubs; in India producing a valuable timber, an oil, and tying materials.

Although Plumier, the pre-Linnean author of the genus based the name on the plant now called *B. aculeata* L. as the type species, the accepted type species of *Bauhinia* is *B. divaricata* L., a monandrous South American species (cf. Int. bot. Congr. 1930, Prop. Brit. Bot. 152. 1939). This implies that the name *Casparia* Kunth must be rejected as it was expressly designed to comprise monandrous species of *Bauhinia*. The type species of *Pauletia* is preferably *Pauletia inermis* Cav. (cf. Persoon, *l.c.*).

Linnaeus's conception of the genus is expressed by the name. Plumier, wishing to commemorate the brothers C. and J. Bauhin, chose a genus characterized by bilobed leaves, viz twin leaflets, "which were united by brotherly relationship and issued from one source." This explanation was given by Linnaeus (Hort. Cliff. 157, 1737), who adopted the genus in the same sense. Nearly all species described by Linnaeus in *Bauhinia* are retained within the generic limits proposed here; *B. scandens* L., which I place in *Lasiobema*, is not really an exception as Linnaeus was acquainted only with Rheede's plate and description of Naga-Mu-Valli (Hort. malab. 8: 57 pl. 30, 31. 1688), which form the only base of his *B. scandens*. Rheede's plate shows bilobed leaves but very little else and his description contains no data concerning the flower. Later on Linnaeus considered Rumphius's *Folium linguae* (Herb. amb. 5: 1 pl. 1. 1747) to be conspecific. It has only the bilobed leaf in common with *B. scandens* and is a totally different plant. This is further proof that Linnaeus took a bilobed leaf as the main characteristic of *Bauhinia*.

The view that the genus *Bauhinia* is one of the more primitive taxa of Bauhinieae is supported by morphological and distributional data (cf. "General part") and it is also in agreement with the distribution of the species occurring in Malaysia.

Undoubted introductions are *B. galpinii* N. E. Brown, *B. monandra* Kurz, *B. purpurea* L., *B. tomentosa* L., and *B. variegata* L.; their occurrence is without bearing on the subject. *Bauhinia blakeana* Dunn is only horticulturally known.

Bauhinia acuminata L. and *B. hirsuta* Weinm. are, possibly, not indigenous any more but re-introduced in historical times by Chinese or Hindus. Nevertheless, apart from that introduction, part of the present populations may still be the ancient stock, surviving as relics. It is to be noted that *B. hirsuta* occurs also in South Siam.

Bauhinia pottsii G. Don is distributed in a most illustrative manner. Backer (MS.) finding *B. pottsii* var. *elongata* (*B. elongata* Korth.) confined in Java to a few isolated localities in the West and in the extreme South-east, expressed his surprise at this anomalous distribution. It seems perfectly natural to assume that *B. pottsii* is a relic in Java which will, in time, disappear from the wild flora. Backer also noted that in Java he never saw it bearing fruit.

Bauhinia pottsii is, however, still widely spread in Borneo and, as it is clearly a link between *Bauhinia* and *Phanera*—among all species of *Bauhinia* it is closest to *Phanera*—, it answers both as to distribution and to morphology to what could be constructed as a link on theoretical grounds. *Bauhinia pottsii* is further found in the north of the Malay Peninsula and has its allies in southern Siam.

Bauhinia viridescens Desv. shows a similar relict distribution: it is confined to a small part of Timor and the islet of Wetar. Like the other Malaysian bauhinias, it has its closest relatives in South Siam; it seems that the species is represented there by nearly identical specimens. *Bauhinia viridescens*, however, fruits freely.

Finally, it is to be noted that the species of *Bauhinia*, in a wild or probably wild state, were never collected in Sumatra or in the Philippines. This cannot be explained, I think, by assuming that collectors overlooked them or that collecting was too incidental. While *Bauhinia* is entirely absent from the collections made in the Philippines and Sumatra, there are hundreds of specimens of *Phanera* from those islands.

Von Ettingshausen (*l.c.*) found the genus in tertiary layers in Central Europe (Radoboj) but Schenk (*Palaeophytologie* 696, 1890) disagrees.

KEY TO THE TAXA IN BAUHINIA

1. Fertile stamen 1. 5. *B. monandra*
1. Fertile stamens 3—10.
2. Fertile stamens 10. Buds smooth; sepals thin. Bud crested by 5 slender, free, twisted, subulate tips. Receptacle turbinate, 1—5 mm long. Seeds albuminous.
3. Flowers yellow. Petals during anthesis broadly imbricate, corolla widely campanulate. Lower surface of leaves rusty pubescent. Leaves up to 7 cm across. Top-lobes rounded. 8. *B. tomentosa*
4. All petals yellow, not discolouring 8. *B. tomentosa* f. *concolor*
4. Standard dark-purple blotched, all petals discolouring reddish. 8. *B. tomentosa* f. *tomentosa*
3. Flowers white. Petals during anthesis more or less distant, spreading or recurved. Lower surface of the leaves grey or rusty pubescent or glabrous. Leaves 5—16 cm across.

5. Leaves more than half bifid, glabrous. Flowers less than 2.5 cm across.
10. *B. viridescens*
5. Leaves less than half bifid, on the lower surface pubescent. Flowers more than 5 cm across.
6. Leaf-lobes acute or acuminate, rarely rounded (sinus narrow). Buds sparsely pubescent, puberulous or more or less glabrous. Pods entirely straight; suture with sharp, raised, parallel rims. . . 1. *B. acuminata*
6. Leaf-lobes rounded, broad (sinus wide). Buds densely woolly pubescent. Top of pod curving; suture without sharp, raised rims. 4. *B. hirsuta*
2. Fertile stamens 3—5. Buds ribbed or winged in the upper part or, rarely, smooth. Bracts ovate, short. Receptacle tubular, 7—45 mm long. Seeds exalbuminous.
7. Fertile stamens 3 (rarely 4).
81. Buds winged towards the top. Receptacle (in the open flower) 7—12 mm long. Leaves on the lower surface glabrous or nearly so. Pods glabrous.
7. *B. purpurea*
9. Petals entirely pink or reddish, standard often with a red centre. Ovary sometimes with red patches. . . . 7a. *B. purpurea* var. *purpurea*
9. Claws of the pallidly pink petals white. Stipe white. Claw of the standard finally red. . . . 7b. *B. purpurea* var. *corneri*
9. All petals violet, rather narrow. Claw of the standard cinnabar.
7c. *B. purpurea* var. *violacea*
82. Buds smooth. Receptacle flat, not tubular. Leaves on the lower surface with sparse, marginal scales. . . . 3. *B. galpinii*
83. Buds smooth. Receptacle in the flower 3—4.5 cm long. Leaves on the lower surface rusty velvety pubescent. Pods pubescent. . . 6. *B. pottii*
10. Upper surface of the leaves glabrous or nearly so, not velvety to the touch. . . . 6b. *B. pottii* var. *elongata*
10. Upper surface of the leaves pubescent, velvety to the touch.
11. Style, ovary, and stipe entirely appressedly velutinous.
6a. *B. pottii* var. *pottii*
11. Style thinly patently hairy or glabrous as is the long stipe. Ovary patently strigose. . . . 6c. *B. pottii* var. *subsessilis*
7. Fertile stamens 5. Stigma small.
12. A (small) tree. Petals (ob)ovate, base of the standard grooved. Buds not or scarcely winged at the top. . . . 9. *B. variegata*
13. Flowers purple-blotched or striped. Pods up to 30 cm long
9a. *B. variegata* var. *variegata*
13. Flowers white, petals partly yellow. Pods less than 20 cm long
9b. *B. variegata* var. *albiflora*
12. A branching shrub. Petals narrow, lanceolate to (ob)ovate, base of the standard not grooved. Buds manifestly winged at the top. 2. *B. blakeana*

1. BAUHINIA ACUMINATA L.—Fig. 1 (1-5)

Bauhinia acuminata Linnaeus, Sp. Pl. 375. 1753 (Rheede, Hort. malab. 1: 61 pl. 34. 1678, as *Velutta-Mandaru*); Burman, Fl. Ind. 94. 1768; Willd., Sp. Pl. 2: 511. 1799; Ham. in Trans. Linn. Soc., Lond. 13: 497. 1822; Weinm. in Syll. Pl. nov. ratish. 2: 19-20. 1826; DC., Prodr. 2: 513. 1825; Wight & Arn., Prodr. Fl. Pen. Ind. or. 295. 1834; Korth, in Verh. nat. Gesch., Bot. 84 pl. 9 f. 3. 1841; Miq., Fl. Ind. bat. 1 (1):

74. 1855; Kurz, For. Pl. Br. Burma 1: 396. 1877; Baker *in* Hook. f., Fl. Br. Ind. 2: 276. 1878; Vidal, Cat. Pl. Prov. Manila 27. 1880; P.-Vill., Noviss. App. 72. 1880; Prain *in* J. As. Soc. Bengal 59 (2): 244, 246. 1890; *ibid.* 66 (2): 179. 1897; Hook. f. *in* Curtis's bot. Mag. 3: 58 pl. 7866. 1902; Perkins, Fragm. Fl. Philipp. 8. 1904; Merr. *in* Philipp. J. Sci. (Bot.) 5: 43. 1910; Fl. Manila 230. 1912; Enum. Barn. Pl. 297. 1921; Enum. Philipp. fl. Pl. 2: 258. 1923; Backer, Schoolfl. Java 417. 1911; Bekn. Fl. Java, Nooduitg., 5 (Fam. 118): 23. 1941; Ridley, Fl. Mal. Pen 1: 625. 1922; Heyne, Nutt. Pl. Ned. Ind., 2de Druk, 736. 1927; Craib, Fl. siam. Enum. 3: 526. 1928; Burkill, Diet. econ. Prod. Mal. Pen. 1: 310. 1935; Corner, Ways. Trees Mal. 379. 1940; *ibid.* 2nd Ed. 379. 1952; Bor & Raizada *in* J. Bombay nat. Hist. Soc. 42: 5. 1940; Meijer Drees *in* Comm. For. Res. Inst., Bogor No. 33: 67. 1951. — *Bauhinia candida* Aiton, Hort. kew. 2: 49. 1789; *sensu* DC., Prodr. 2: 513. 1925 (*non* Roxb.). — *Bauhinia tomentosa* Naves *in* Blanco, Fl. Filip., Ed. 3, pl. 111. 1877-1883 (*non* L.). — *Bauhinia grandiflora* Blanco *sensu* Merrill *in* Philipp. J. Sci. (Bot.) 2: 433. 1907 (*cf.* sub *Gigasiphon dolicho-calyx*).

An erect shrub about 3 m high; young parts greyish woolly pubescent; branchlets zig-zag. Leaves ovate to subrotundate, bifid for about $\frac{1}{2}$, subcoriaceous, (7—)9—11-nerved; (7—)12—about 20 cm across; base cordate to rounded; top-lobes acute, rarely subacuminate to blunt or, very rarely, more or less rounded; upper surface glabrous, lower grey-pubescent (finally glabrescent), glaucous; petiole about 6 cm, grooved or angular; stipules linear, pubescent, about 1—2 cm long, tardily caducous. Flowers not numerous, in lateral, short racemes, $\bar{\sigma}$ or rarely σ , on 1—2 cm long striate pedicels; bracts and bracteoles linear (intrabracteolar trichomes present). Buds fusiform, thinly hairy to glabrous, crested by 5, about 3 mm long, free "calyx-teeth" suggesting spider-legs. Receptacle turbinate, about 5 mm long. Calyx-limb spathaceous, about 3 cm long. Petals (ob)ovate to lanceolate, blunt, 3.5—5(—6) cm long, not clawed, nearly equal. Stamens 10 perfect; filaments 1.5—2.5 cm long, hairy at the shortly connate base; anthers 4—7 mm long, with hairy connective, narrow. Ovary stiped (stipe free), almost glabrous; style sparsely pubescent, stout, exceeding 15 mm; stigma peltate, bilobed, grooved, small or medium sized. Pod linear, septate, 3—11-seeded, 7—15 cm long, less than 2 cm wide, with sharp-rimmed, raised sutures; seeds up to 1 cm across, flattened.

TYPE.—Hermann Ceylon Herb. 148 (BM).

DISTRIBUTION.—South-east Asia (Pegu; Assam to Cambodia). Cultivated in Malaysia; possibly wild in Java, Borneo, the Philippines, and the Lesser Sunda Islands.

ECOLOGY.—Mostly found in the drier parts of Malaysia, usually cultivated, sometimes as an escape, perhaps even wild. Ridley (1922) stated: "I have never seen any (in the Malay Peninsula) which appeared to be really wild." To Burkill (1935) it appeared to be wild in the mountains of Perak. Corner (1940) thought it occurred "doubtfully wild" in the Peninsula. Merrill (1923) said it was probably introduced into the Philippines. Backer (1911) was at first convinced of its having been introduced into Java but ultimately (1941) believed it to be indigenous there: "occasionally wild, particularly in regions subject to pronounced dry season (teak

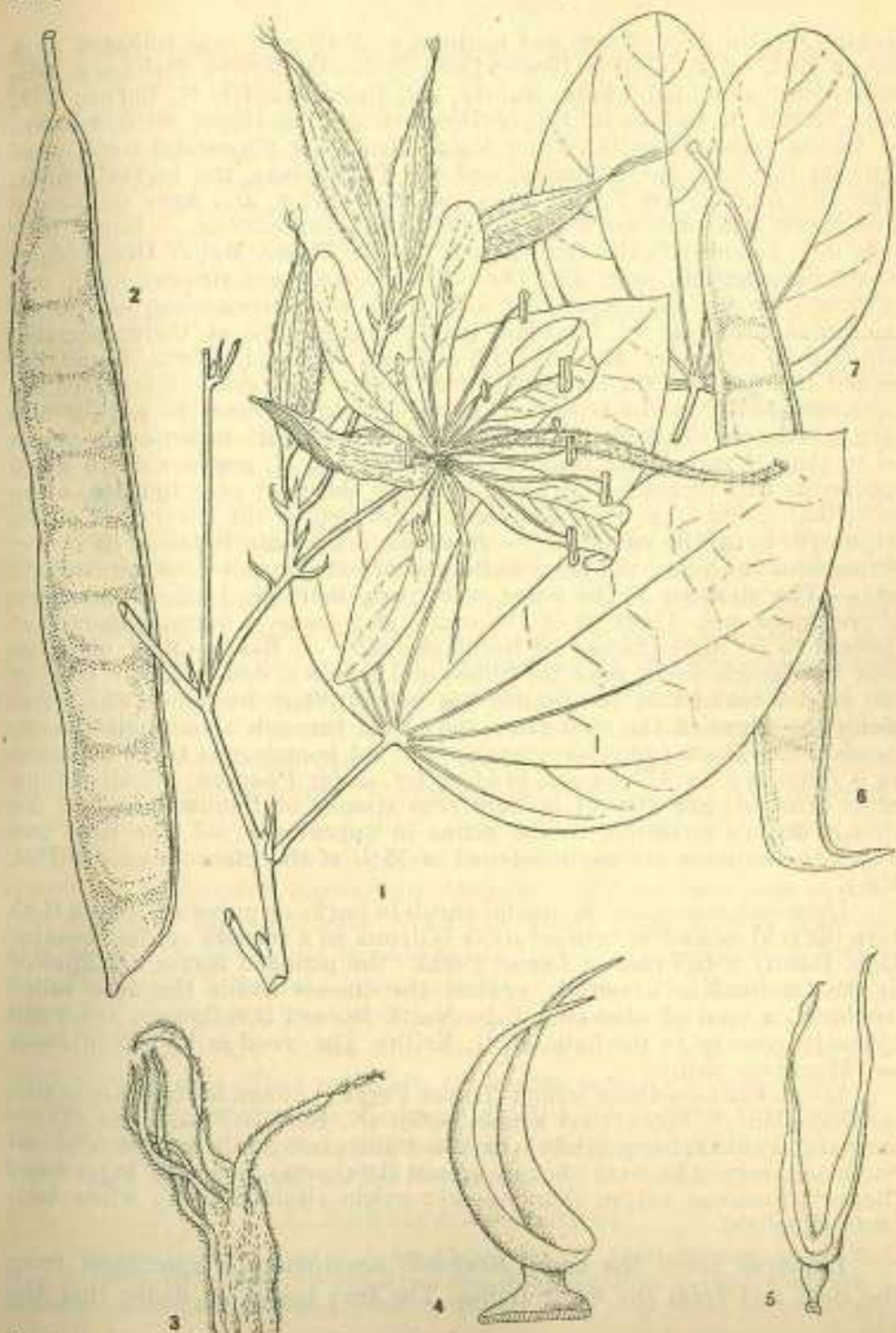


FIG. 1. — *Bauhinia acuminata* L.: 1, 2, inflorescence, leaves, and pod, nat. size; 3, top of bud, 1 \times ; 4, 5, funicular branches, 7 \times . — *Bauhinia hirsuta* Weinm.: 6, 7, pod and leaf, nat. size.

forests), in thickets at low and medium alt." Once it was collected as a woody vine, 4 feet high, in flower [British North Borneo, Melobang, seashore, local name kaba kaba (suluk), leg. Balajadia, Br. N. Borneo For. Dept 3293]. According to Meijer Drees (*l.c.*) it is absent on Sumbawa. — In the driest districts of the Malay Peninsula (limestone rocks near Gunung Pondok), the Moluccas, and the Philippines, the leaves remain generally smaller, are lighter in colour and stiffer, and have commonly nine nerves; the buds are more swollen in those specimens. — Bor & Raizada (*l.c.*) found it "quite frost-hardy." — On Timor, Meijer Drees found it a "characteristic species of the Schleichereta," not fire-resistant, and in "very dry regions deciduous." — Urban, when discussing the minute trichomes occurring in *Bauhinia* inside the stipules at their insertion which may be looked upon as the earliest stages of spines, found the second step towards the development of spines in *B. acuminata*. Here the trichome closest to the insertion of the petiole increases to a 1—2 mm long, persistent, leathery, blunt-tipped outgrowth; its direction is parallel to that of the stipule (see also *B. pottsii* and *B. purpurea*). In dried specimens this increased trichome is easily observed as a ligulate, often more than 2 mm long, body, its insertion covered by the lower part of the stipule; it is tardily caducous. — *Bauhinia acuminata* is found in flower throughout the year; the pure white flowers are scentless or very nearly so. — The stamens of the outer whorl are distinctly longer than those of the inner one. Abortion of the ovary may cause a certain amount of flowers to be male instead of hermaphrodite. — Baker (MS.) observed that the funicle forks near the hilum and leaves a double linear scar on the seed. I found that the funicle has two capillary branches which run along the edges of the seed from the hilum through about half its circumference. These funicular branches are not homologous to an aril such as is found e.g. in *Azalia* and *Sindora* (*cf.* under *Phanera*). Similar funicular branches are present in numerous species of *Bauhinia* and the funicle differs according to the genus in appearance. — The first two leaves in seedlings are asymmetrical in 75% of the plants (van der Pijl, MS.).

USES.—A common ornamental shrub in parks or gardens. Heyne (*l.c.*) says the cold extract of bruised roots is drunk as a remedy against coughs. Moh. Haniff noted that in Lower Perak "the pounded leaves are applied to the forehead as a remedy against the disease inside the nose called 'resdong', a kind of ulceration." In North Borneo the flowers are worn by native women in the hair (H. G. Keith). The wood is known in India as "Mountain ebony."

LOCAL NAMES.—Daun bunga (Lower Perak); bunga kertas (Kedayan), tangkop (Murut bakan); sri kepala puteh (N. Borneo); bambang (Tagalog) and kulibangbang (Iloko) in the Philippines; tali kantju (Central Sumatra), solpa (Asahan); bugan ijrisan (Djakarta), aroj (ki) kupu kupu (Bogor), panawar saribu (Sundanese); galela (Halmahera); white bauhinia (English).

Linnaeus based the name *Bauhinia acuminata* on specimens from the East and from the West Indies. The text leaves no doubt that the

East Indian specimen(s) is to be regarded as the type (*cf.* Savage, Ind. Linn. Herb. 73, 1945).

Bauhinia candida Aiton has often been treated as a synonym of *B. acuminata*. Aiton's description (no type is known to exist) allows of no certain identification, but it points to a species of *Bauhinia* with bluntly lobed leaves. I referred it to *B. variegata* in accordance with Roxburgh's view, *cf.* under *B. variegata*).

Typification.—Linnaeus (Sp. Pl. 375, 1753) when describing *Bauhinia acuminata* added to the description as references: "Hort. cliff. 157, Fl. zeyl. 148. . . . Sloan. jam. 150. hist. 1. p. 51. . . . Rheed. mal. 1. p. 61. t. 34. Raj. hist. 1751." In the Linnean Herbarium, London, are two sheets, numbered 525.4 and 525.5. Both carry a specimen of a South American species of *Bauhinia sensu amplissimo*, or in a stricter sense, of *Schnella* Raddi. Sheet 525.4 bears in Linnaeus's handwriting "8 acuminata"; 525.5 also "acuminata" in his handwriting. Both specimens are entirely different from what has been currently accepted as *B. acuminata* L. in the last century. Linnaeus's five-word description can be made to fit either on this "*Schnella*" or on *B. acuminata* L. and authors. I reject both specimens in the Linnean Herbarium as possible types and assume that Linnaeus either misinterpreted his own species, as he originally intended it, or that he discarded, or made a present to some other botanist, of the type. I take it that the type is no longer present in the Linnean Herbarium.

The first reference, that to "Hortus Cliffortianus" (1737!), is illustrated by a specimen in the "Hortus siccus Cliffortianus," now preserved in the British Museum (Nat. Hist. Dept); this number (157) bears flat, pubescent pods and is, to all appearances, conspecific with the two specimens in the Linnean Herbarium. Actually, the specimens seem so alike that they may have originated from one single plant. I think that this specimen is, therefore, not eligible as the type of *B. acuminata* L. either.

The second reference Linnaeus made in 1753, is to "Flora zeylanica" (no. 148, p. 63, 1747). The specimen referred to is in Hermann's "Ceylon Herbarium" (vol. 1, p. 42, no. 148), also preserved in the British Museum (Nat. Hist. Dept). This specimen represents what has been commonly adopted as *B. acuminata* L. Linnaeus drafted the description which fits the leaves exactly but made no mention of the flower, which is present. I designate this specimen as the lectotype of *B. acuminata* L.

2. BAUHINIA BLAKEANA DUNN

Bauhinia blakeana Dunn in J. Bot., Lond., 46: 325, 1908; Holttum in M.A.H.A. Mag. 9: 68-69, 1939; Corner, Ways. Trees Mal. 379, 1940; *ibid.*, 2nd Ed., 379, 1952. — *Bauhinia variegata* × *Bauhinia purpurea* prob.!

Bauhinia blakeana suggests *B. variegata* L. in appearance and agrees with it in most characters. It is distinguished in the herbarium by the buds which are manifestly five winged towards the top and by narrowly oblong or lanceolate, up to 5 cm long petals.

It is also close to *B. purpurea* L., but differs in having five fertile stamens and two to five staminodes, possibly also by the colour of the flowers and the presence of white near the base of the three upper petals.

TYPE.—Hongkong Herb. 1722 (holotype, *n.v.*).

DISTRIBUTION.—First collected in a garden on Hongkong; cultivated in Malaysia and only horticulturally known.

ECOLOGY.—Furtado (*in sched.*, Herb. Singapore) described the filaments as "pink or white, anthers, pollen, and pistil white." The pistil is small, knob-shaped. Corner stated that the flowers are "faintly scented" and that it is "the showiest of all shrubby bauhinias in Malaysia. It resembles *B. variegata* but it never develops a trunk." Holttum (*l.c.*) wrote: "Its flowers are much more brilliant than those of any allied species, being quite large and of a bright purple colour, the odd petal a more vivid crimson-purple. All the petals have paler veins. The flowers have a very pleasant perfume."

USES.—It seems a most desirable ornamental shrub and it was grown successfully in the Botanical Gardens at Singapore and Hongkong. Propagation by cuttings.

LOCAL NAMES.—Blake's bauhinia, Hong Kong tree-bauhinia (English).

Bauhinia blakeana is of uncertain origin, possibly Chinese, but certainly not native in Malaysia. It suggests by its morphology to be a hybrid between *B. variegata* L. and *B. purpurea* L. and it is to be noted that it is not known to set fruit. The hybrid may have been raised in Chinese gardens.

3. BAUBINIA GALPINII N. E. BROWN—Fig. 2

Bauhinia galpinii N. E. Brown *in* Gdnrs' Chron. 9: 728. 1891. — *Bauhinia punctata* Bolle *in* Peters Reise Moss. 1: 23. 1862 (*non* Jacq.); Oliver *in* Hook. Ic. Pl. pl. 1994. 1891; Marloth, Fl. Pl. S. Africa 2: pl. 79. 1922; Burt-Davy, Man. fl. Pl. Transvaal & Swazil. 2: 323. 1926-32; Bor & Raizada *in* J. Bombay nat. Hist. Soc. 42: 7 pl. 1940.

A shrub; ultimate branchlets puberulous; no tendrils. Leaves orbicular, broader than long, $\frac{1}{5}$ — $\frac{1}{4}$ bifid, chartaceous, 7-nerved, 2.5—3 cm long, 3—5 cm wide; base broadly shallowly cordate; top-lobes broadly rounded, blunt; lower surface sparsely minutely puberulous and with a marginal zone of small yellow scales; petiole slender, grooved, puberulous, 1—1.5 cm long; stipules pubescent, linear, 1.5 mm long. Flowers in few-flowered, short, lateral, rusty puberulous racemes; pedicels puberulous, 2 cm long, very stout and suggesting the presence of a long, tubular receptacle; bracts subulate, 2 mm long. Buds spindle-shaped, acute. Receptacle

flat (calyx-tube absent); limb spathaceous, finally reflexed, about 2 cm long. Petals ob-spathulate, glabrous 3—3.5 cm long (including the 1.5—2 cm long claw). Stamens 3 perfect; filaments stout, fleshy, nearly as long as the petals, glabrous; anthers very early shed, ellipsoid-oblong, opening lengthwise; staminodes 7, capillary, a few mm long. Ovary rusty puberulous, on a long, thick stipe; style stout, puberulous; stigma terminal, very little swollen. Pods rather thick-valved, on a 1 cm long stalk, 5—7 cm long, about 1.5 cm wide, glabrous; seed 3—5, glossy, brown, 8 mm across; funicle with two short, acute, ariloid excrescences which are not appressed to the seeds.

DISTRIBUTION.—South Africa. Introduced in Malaysia.

ECOLOGY.—A handsome shrub with bluish green leaves and cinnamon flowers. The yellowish, minute scales which occur mostly along the margin of the leaf on the lower surface, are also found scattered on the lower surface generally, on the petals and the ovary. I think they are of a glandular-excretory nature.

USES.—A valuable garden plant, cultivated throughout India and here and there in Malaysia.

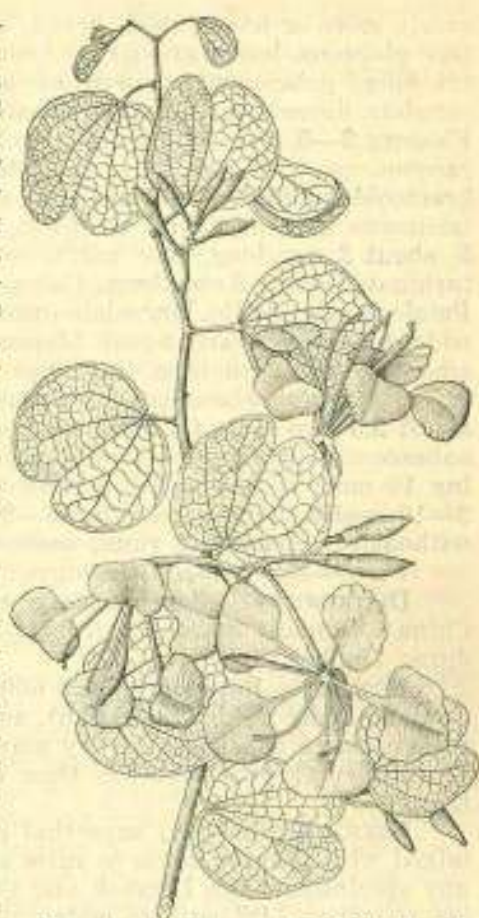


FIG. 2. *Bauhinia galpinii* N. E. Br.: leaves and flowers, 2/5 X.

4. *BAUHINIA HIRSUTA* Weinm.—Fig. 1 (6, 7)

Bauhinia hirsuta Weinmann in Syll. Pl. nov. ratiab. 2: 9. 1826; Reinw. apud Bl., Cat. 's Lands PIT. 68. 1823, nomen nudum; Korth. in Verh. nat. Gesch., Bot 85. 1841, homonym; Miq., Fl. Ind. bat. 1 (1): 76. 1855; Backer, Schoolfl. Java 417. 1911; Bekn. Fl. Java, Nooduitg., 5 (Fam. 118): 23. 1941; Heyne, Nutt. Pl. Ned. Ind., 2e Druk, 736. 1927. — *Bauhinia eximia* Miq., Fl. Ind. bat. 1 (1): 75. 1855; Backer, Bekn. Fl. Java, Nooduitg., 5 (Fam. 118): 23. 1941. — *Bauhinia acuminata* var. *hirsuta* (Korth.) Craib, Fl. siam. Enum. 3: 516. 1928. — *Bauhinia mollissima* Wall. senon Ridley, Fl. Mal. Pen. 1: 626. 1922, pro parte.

An erect shrub, 1—3 m tall; young parts brownish woolly pubescent, only gradually glabrescent; branchlets zig-zag. Leaves broadly ovate to subrotundate, often broader than long, up to ¼ bifid, subcoriaceous, 9-nerved, 10—16 cm across; base shallowly cordate; top-lobes rounded,

rarely more or less acutish, broad, separated by a wide sinus; upper surface glabrous, lower greyish or brownish woolly pubescent; petioles 2—5 cm long, pubescent, grooved or angular; stipules nearly to the base subulate, densely spreadingly pubescent, about 1 cm long, tardily caducous. Flowers 2—5 in a lateral (or terminal) short, densely brown pubescent raceme, on 4—8 mm long, spreadingly pubescent pedicels; bracts and bracteoles subulate, 3—6 mm long, spreadingly pubescent (intrabracteolar trichomes present). Buds fusiform, densely woolly pubescent, crested by 5, about 2 mm long, free 'calyx-teeth' suggesting spider-legs. Receptacle turbinate, about 5 mm long. Calyx-limb spathaceous, about 2.5 cm long. Petals nearly sessile, lanceolate-ovate, blunt, 3—3.5 cm long, about 1.5 cm wide, glabrous, nearly equal. Stamens 10 perfect; the outer whorl of filaments about 2 cm long, the inner whorl about 4 mm shorter, glabrous, hairy at the short-connate base; anthers with hairy connective, narrow, about 2.5 mm long. Ovary stiped (stipe free), glabrous except for some pubescent hairs on the margins and near the base; style glabrous, exceeding 10 mm; stigma small, peltate, bilobed, grooved. Pod linear, septate, 3—10-seeded, with curved top, 6—9 cm long, up to 1.5 cm wide; sutures without parallel, sharp rims; seeds up to 8 mm across, flattened.

TYPE.—Korthals *s.n.* (neotype; L 908.7-254).

DISTRIBUTION.—South-eastern continental Asia (Cambodia; Cochinchina; Yunnan; Siam). Malaysia: Malay Peninsula; Java, possibly Madura; Lombok?

ECOLOGY.—Between 50 and 600 m altitude. Mostly in teak forests or in alang-alang fields (Junghuhn), sometimes locally common but as a rule rather scarce (Backer); on dry marl soils. Flowers throughout the year. The funicular forks are less than half as long as the circumference of the seed.

USES.—Heyne (*l.c.*) says that in East Lombok the pounded bark is mixed with bran or grass to raise an appetite in horses. I have not seen any specimens from Lombok and the record is possibly based on a misidentification [*Piliostigma malabaricum* (Roxb.) Benth.?].

LOCAL NAMES.—Sendajak, kendajakan puti, kletjon, tajuman, (ter)-kantju (Java).

Bauhinia hirsuta Korth. is a later homonym (for the same species) of *B. hirsuta* Weinm. which has been generally overlooked, e.g. by Craib when he reduced *B. hirsuta* to a variety of *B. acuminata* L. It seemed best to typify the species by a specimen collected by Korthals in the absence of Weinman's type. *Bauhinia hirsuta* Korth. is also a later homonym of *B. hirsuta* Vogel (1839).

Bauhinia hirsuta and *B. acuminata* are closely related but the former is consistently different in a number of characters, such as the shape of the leaf (rounded lobes, wider sinus), the smaller flowers, amount of pubescence, and pods with curved beak and without sharp rims along

the suture. The intrastipular enlarged trichome is possibly even larger than in *B. acuminata*.

It seems possible that *B. acuminata* and *B. hirsuta* were introduced in the same manner, from the same country of origin.

The holotype of Miquel's *Bauhinia eximia* is a leaf only (Horsfield s.n.; U) and belongs here.

5. BAUHINIA MONANDRA Kurz

Bauhinia monandra Kurz in J. As. Soc. Bengal 42 (2): 73. 1873; For. Fl. Br. Burma 1: 395. 1877; Baker in Hook. f., Fl. Br. Ind. 2: 285. 1878; Prain in J. As. Soc. Bengal 66 (2): 505. 1897; Merr. in Philipp. J. Sci. (Bot.) 4: 265. 1909; *ibid.*, 5: 46. 1910; Fl. Manila 231. 1912; Backer, Schoolfl. Java 416. 1911; Fawcett & Rendle, Fl. Jamaica 4 (2): 118. 1920; Merr., Enum. Philipp. fl. Pl. 2: 260. 1923; Amshoff in Pulle, Fl. Suriname 2 (2): 44. 1939; Bruggeman, Ind. Tuinb. 224. 1939; Corner, Ways. Trees Mal. 380. 1940; *ibid.*, 2nd Ed., 380. 1952. — *Bauhinia richardiana* Voigt, Hort. Suburb. Calcutt. 255. 1845 (non DC.). — *Bauhinia kappeleri* Sagot in Ann. Sci. nat. (Bot.) VI 13: 317. 1882; Perkins, Fragm. Fl. Philipp. 1: 13. 1904; Merr. in Publ. Govt Lab. Philipp. No. 29: 17. 1905. — *Bauhinia krugii* Urban in Ber. dtsh. bot. Ges. 3: 83. 1885. — *Caspariopsis monandra* (Kurz) Br. & Rose in N. Amer. Fl. 23 (4): 217. 1930. — *Bauhinia subtundifolia* Cav. sensu F.-Vill., Noviss. App. 72. 1880; Naves in Blanco, Fl. Filip., Ed. 3, pl. 82. 1877-83.

A shrub or small tree; young parts rusty pubescent. Leaves broadly ovate, often broader than long, nearly $\frac{1}{2}$ bifid, chartaceous, 11-nerved, 7—15 cm across; base truncate to very shallowly cordate; top-lobes rounded to acutish; sparsely pubescent on the lower surface when young, later on glabrous except for the pubescent nerves; petiole pubescent to glabrescent, 4—6 cm long; stipules 6—7 mm long, pubescent, base broadened, ovate, top-part long-drawn acute. Flowers in short, densely pubescent racemes on up to 1 cm long, pubescent pedicels; bracts about 5 mm long, ovate, acute, caducous; bracteoles linear, veined, 6 mm long, acute, the insertion raised on the pedicel; 5—6 intrabracteolar trichomes present, placed at the base of the receptacle. Buds (limb) spindle-shaped, crowned by 5 minute, subulate tips. Receptacle narrowly tubular, more or less striate, 2.5—3 cm long, gradually widening from base to mouth. Sepals broadly spathaceous, 1.5—2 cm long, tomentose. Petals ovate to rhomboid, gradually tapering into a long claw (claw glabrous or on the margins ciliate), 4—5 cm long. Stamens 1 perfect, 2.5—5 cm long; filament glabrous except at the base; anthers 5—6 mm long, narrow; 9 reduced stamens or staminodes, filaments hairy, about 3 mm long, free or nearly so. Ovary much shorter than the perfect stamen; stipe free, on the centre woolly, glandular pubescent; style sparsely pubescent; stigma oblique, flattened, slightly broader than the style. Pods smooth, glabrous, nearly septate, 10—20-seeded, thick, up to 20 cm long and 2 cm wide; seeds albuminous.

TYPE.—Brandis s.n., Martaban?, Burma (holotype; n.v.).

DISTRIBUTION.—In Malaysia only cultivated. Also in India, Indo-China, South-eastern Pacific, and the West Indies.

ECOLOGY.—I noted at Bogor that four petals were white, dotted purple on the inner surface and tinged purple on the outer; the recurved standard had large purple spots and was yellowish near the margins and in the centre. Flowers and fruits freely. — Backer observed male flowers containing an abortive ovary.

LOCAL NAMES.—Pink bauhinia (English).

USES.—A favoured garden shrub, cultivated below 700 m altitude.

Amshoff suggested that *B. monandra* were native to Asia; it was first discovered by S. Kurz in Burma. Fawcett & Rendle (*l.c.*) think it "probably native in Guiana." Merrill stated: "A native of tropical America, now pantropic." Perkins said, "possibly Burma." Backer thought that it came probably from Madagascar. I am in favour of Merrill's opinion; the morphology of *B. monandra* is certainly suggestive of a South American origin. It is another example of a commonly cultivated plant that seems unknown in a wild state. Brass found it "growing thickly on old garden clearings," near Kubuna (Papua), and Clemens, cultivated at the Kajabit Mission (Papua, Morobe).

6. BAUHINIA POTTSII G. DON

Bauhinia pottsis G. Don, Gen. Syst. 462. 1832; Prain in J. As. Soc. Bengal 66 (2): 181, 185, 500, 502. 1897, in synonym. — *Bauhinia elongata* Korth. in Verh. nat. Gesch., Bot. 89 pl. 24. 1841; Miq., Anal. ind. 1: 12. 1850-52, Fl. Ind. bat. 1 (1): 61. 1855; an Kurz, For. Fl. Br. Burma 1: 398. 1877; Baker in Hook. f., Fl. Br. Ind. 2: 281. 1878; Prain in J. As. Soc. Bengal 66 (2): 181, 183, 499, 502. 1897, in synonym.; Merr. in Philipp. J. Sci. (Bot.) 5: 46. 1910; Backer, Schooffl. Java 415-416. 1911; Bekn. Fl. Java, Nooduitg., 5 (Fam. 118): 24. 1941; Heyne, Nutt. Pl. Ned. Ind., 2de Druk, 736. 1927. — *Bauhinia mollissima* Wall., Cat. No. 5782. 1831-32, nom. nud.; Prain in J. As. Soc. Bengal 66 (2): 180, 183, 185, 499, 502. 1897; Brandis, Indian Trees 259. 1906; Ridley, Fl. Mal. Pen. 1: 626. 1922. — *Phanera elongata* Benth. in Pl. Jungh. 262. 1852; Miq., Anal. ind. 1: 12. 1850-52; Fl. Ind. bat. 1 (1): 61. 1855. — *Phanera speciosa* Bl. ex Miq., Fl. Ind. bat. 1 (1): 61. 1855, in synonym. *Phanera elongatae* Korth. var. *β.* (non Roxb., nec Vogel). — *Bauhinia subsessilis* Craib in Kew Bull. 1927: 392. — *Bauhinia purpurea* L. sensu Zoll. in Nat. geneesk. Arch. Neerl. Ind. 3: 69. 1846.

6a. Var. POTTSII.

A slender, climbing shrub, up to 30 m long; branchlets softly tomentose, gradually glabrescent. Leaves broadly ovate or rounded, $\frac{1}{2}$ bifid (sinus wide), with broadly rounded top-lobes, 11—13-nerved, about 10—12 cm across; subcoriaceous, upper surface softly velvety to the touch, very gradually glabrous, lower surface densely rusty velvety pubescent; petiole pubescent, up to 5 cm long; stipules ovate, falcate, acute, pubescent outside, caducous; intrastipular trichomes well-developed, the trichome nearest to the petiole subulate, a few mm long, patent, spiniform. Flowers in sturdy, short, lateral, warty racemes; warts (after the flowers have been shed) much raised; pedicels short, 0.5—1.5 cm long, the recept.

acle suggesting a pedicel, 1.5—3 cm long; bracts ovate, acute, rusty tomentose outside, about 2 mm long; bracteoles similar, smaller, in the lower half of the pedicel. Buds smooth, narrowly oblong. Limb rusty velutinous (numerous glands among the hairs), up to 3 cm long, at anthesis splitting at the base but the sepals coherent in the upper half, one or two slits continuous; sepals strap-shaped. Petals oblong to narrowly (ob) lanceolate, gradually tapering to an 1—2.5(—3) cm long claw, crisped, thinly fugaciously hairy externally and along the claw, 5—7.5 cm long including the claw), 1—2(—3) cm wide. Stamens 3 fertile; filaments glabrous, about 5 cm long, yellowish; anthers linear, 12 mm long, with sparse, long, thin hairs especially at the base; staminodes 3—4, short, subulate, free. Ovary appressedly woolly, on a long hairy stipe which is connate with the receptacle wall, 6—8-ovulate; style long, hirsute; stigma small, knob-shaped. Pods pubescent, flat, long-beaked, about 10—17 cm long 2.5 cm broad, long-stalked; seeds 1—2, orbicular, 1 cm across, on a very small funicle (branches short), nearly sessile.

TYPE.—Wolfe *s.n.*, Dec. 15, 1938 (neotype; SING).

DISTRIBUTION.—South-eastern Siam; Birma (Tenasserim). Malaysia: Malay Peninsula: Penang, Kedah (Gunung Raya; Badong; Langkawi; Yan), Perak (Larut; South Krian Estate).

ECOLOGY.—Forests or riverside blukar, swamps, at sea-level or low altitudes. The leaves are strikingly silvery green. The petals may attain a length of 7—7.5 cm, the anthers, of 1.5 cm. Corner noted that the flowers were "very fragrant of lilac." Stamens green.

USES.—A garden shrub.

Prain, and after him many Singapore botanists (except Ridley), considered Javan *Bauhinia elongata* Korth. conspecific with *B. mollissima* Wall. ex Prain (better called *B. pottsii*), which is certainly correct but the specimens from the north of the Malay Peninsula and south-eastern Siam differ to some extent and as they are likely to represent the taxon in *B. pottsii* which contained the type; the Javan (and Bornean) specimens are better kept separate as a variety. Corner S.F.37992 is a good intermediate specimen.

Bauhinia pottsii was described by Don as a "native of Pulo Penang" but the name is not mentioned by Ridley in his "Flora of the Malay Peninsula." "Index kewensis" referred it to *B. ferruginea* Roxb. (I do not know on what evidence) but Prain was of opinion that *B. pottsii* was conspecific with *B. elongata* for which he preferred Wallich's name *B. mollissima*. I have not seen the type of *B. pottsii* (nor had Prain) and it seems that there is no type extant, but Don's meagre description fits *B. elongata* and probably the type belongs with what was later described as *B. mollissima* Wall. ex Prain (type: Wallich 5782; K). It is necessary to indicate a neotype for *B. pottsii* (see above); this was collected in a swamp, near Bedong Group Hospital, Kedah.

Bauhinia pottsii occurs in Java as a variety (var. *elongata*) occupying disjunct relict areas (see p. 392).

Bauhinia pottsii is a link between *Bauhinia*, *Gigasiphon* (having the reduced pedicel and greatly lengthened receptacle), and in particular *Phanera* (characters of the calyx somewhat approaching those of *Phanera* and free staminodes), and in the latter genus most closely related to *P. sylvani*. Its affinities are further discussed in the notes under *Bauhinia*.

6b. Var. *elongata* (Korth.) de Wit, var. & stat. nov.—Fig. 3

Bauhinia elongata Korthals in Verh. nat. Gesch., Bot. 89 pl. 24, 1841. — *Phanera speciosa* Bl. ex Miq., Fl. Ind. bat. 1 (1): 61. 1855.

A shrub, sometimes a straggler, up to 15 m tall, short-stemmed, with an oblong, dense crown; branchlets terete, with few large lenticels. Leaves sometimes broader than long, $\frac{1}{2}$ — $\frac{1}{2}$ bifid, 9—13(—17) cm long, 6.5—12(—17) cm wide; upper surface (thinly) pubescent or glabrescent, lower surface densely rusty pubescent. Inflorescence, flowers, etc. as in variety *pottsii* from which variety *elongata* may be distinguished by a more glabrous upper surface of the leaves (not softly velutinous) and by the absence of rows of gland-like trichomes on the disc. The petals are narrower than in variety *pottsii*, the stamens and staminodes are possibly somewhat shorter.

TYPE.—Korthals s.n., Borneo (lectotype; L 908.3-1).

DISTRIBUTION.—Malaysia: Sumatra: Palembang (cultivated); Borneo: Dusun (near Barito R.), Sungai Landak; South-eastern Division, Pulu Pinang, Lawa R.; Java: Tjitajam, Tjampea (Mt. Salak), Depok, Bantam (Djasinga, Madja, Bodjongmanik), Kediri (Mt. Wilis), Besuki (Banjuwangi), Pasuruan (Djatiroto); Kangean Arch.; Lesser Sunda Is.: Bali (Brambang, Pulukan).

ECOLOGY.—In Java (West and extreme south-eastern) occurring locally from 5 to 150 m altitude, in Bali at 300 m, in open secondary forests, dry areas, teak forests, also on river banks. It flowered at Singapore February to March; Backer found it in flower in Java from May to August. The petals are wavy and red with yellow margins and yellow (streaks in the) centre, once (Bali) they were described as pink with green midrib; scattered light coloured glandlets are present on their outer surface. — Backer never found a pod in any Javan specimen. He noted its lack of tendrils and described it as a shrub with erect or overhanging twigs which might wind once or twice round some support and then stand and grow unsupported, 3—15 m tall. — Between each stipule and the base of the petiole one filiform, subulate excrescence ("trichome") is observed, entirely glabrous, about 3 mm long, with a flattened base. In variety *pottsii* this normally erect trichome is sometimes bent laterally and suggests the beginning of a spine although it certainly never functions as such. In the tomentum on the nerves many glandular hairs occur; on the buds these appear as hundreds of light coloured glandlets (dried specimens boiled) which may be observed on ten times magnification. The

ovarial stipe, as far as it is connate, appears as a strigose, raised rim which is studded by glandlets on the inner anterior wall of the receptacle.

LOCAL NAMES.—Sebari (Java) ; aroy kikupo kupo, aroy tjendali (Sundanese) ; somito, sobheuri (Kangean) ; bardjeu (Bali) ; sajak lajau kelokop (Borneo: Kutai-Dyak).

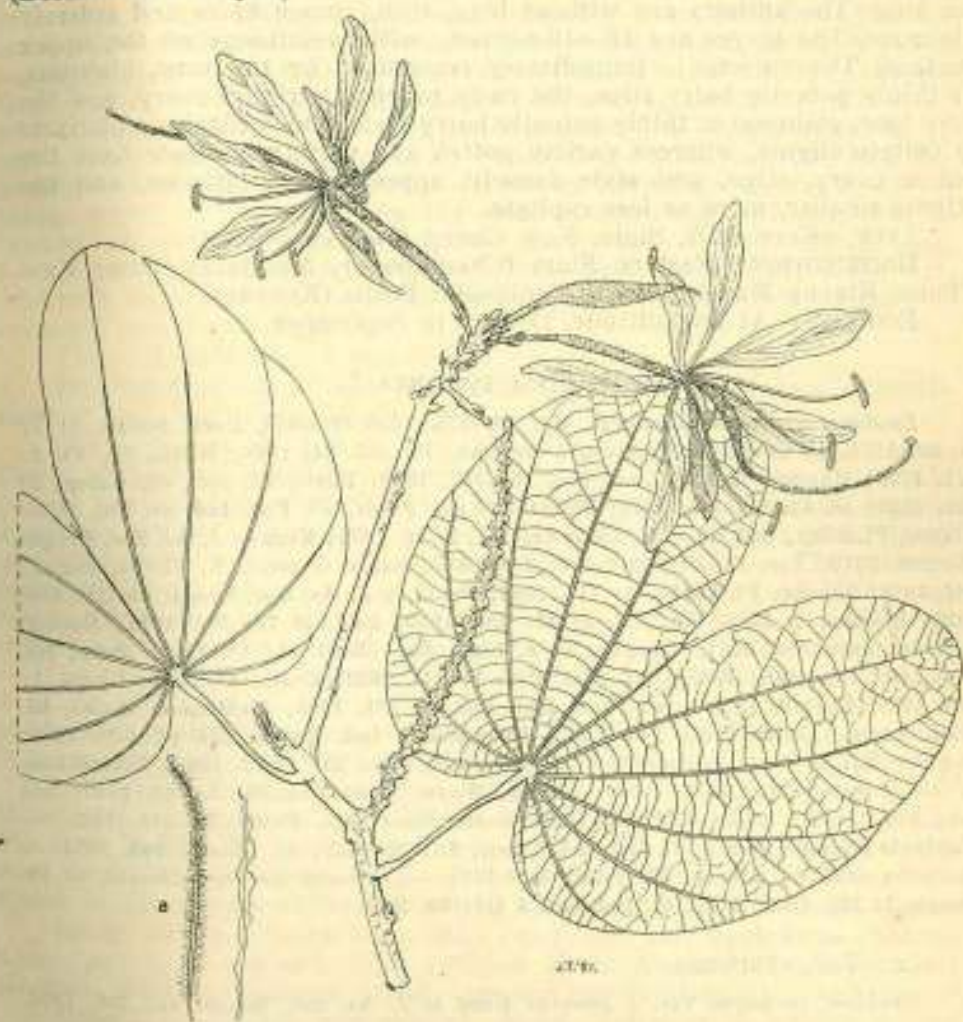


FIG. 3. — *Bauhinia pottsii* var. *elongata* (Korth.) de Wit, $\frac{1}{2}$ \times . — *Bauhinia pottsii* var. *subsessilis* (Craib) de Wit: a: ovary and petal, $\frac{1}{2}$ \times .

USES.—When regularly trimmed, a handsome garden shrub. On Kangean the tough bark is used for tying.

The type of the invalidly published name *Bauhinia speciosa* (non Roxb. nec Vogel) Bl. ex Miq. (*l.c.*; L 908.107-1011) belongs here.

6c. Var. *subsessilis* (Craib) de Wit, var. & stat. nov.—Fig. 3 (a)

Bauhinia subsessilis Craib in Kew Bull. 1927: 392.

A climbing or straggling shrub. It differs from variety *pottsii* and variety *elongata* in having white, yellow-centred petals which are 3—5.5 cm long. The anthers are without long, thin, sparse hairs and entirely glabrous. The leaves are 13—15-nerved, softly velutinous on the upper surface. The variety is immediately recognized by the long, glabrous, or thinly patently hairy stipe, the rusty patently strigose ovary, and the very long, glabrous or thinly patently hairy style, which carries a distinctly peltate stigma, whereas variety *pottsii* and variety *elongata* have the entire ovary, stipe, and style densely, appressedly velutinous, and the stigma smaller, more or less capitate.

TYPE.—Kerr 9207, Siam, Kaw Chang (holotype; K).

DISTRIBUTION.—Eastern Siam (Chantaboon). Malaysia: Siam: Kaw Chang, Klaung Mayom; Malay Peninsula: Perlis (Kangar).

ECOLOGY.—At low altitude, flowers in September.

7. BAUHINIA PURPUREA L.

Bauhinia purpurea Linnaeus, Sp. Pl. 375. 1753 (Rheede, Hort. malab. 1: 57 pl. 33. 1678, as Chovanna-Mandaru); Burman, Fl. ind. 94. 1768; Willd., Sp. Pl. 2: 511. 1799; Ham. in Trans. Linn. Soc. 18: 497. 1822; Roxb., Fl. ind., ed. Carey, 2: 320. 1832; ed. Clarke, 345. 1874; Wight & Arn., Prodr. Fl. Pen. Ind. or. 296. 1834; Blanco, Fl. Filip., 2nd Ed., 231. 1845; 3rd Ed., 2: 66. 1878; Kurz in J. As. Soc. Bengal 45: 288. 1876; For. Fl. Br. Burma 1: 398. 1877; Baker in Hook. f., Fl. Br. Ind. 2: 284. 1878; Trimen, Fl. Ceylon 2: 117. 1894; Prain in J. As. Soc. Bengal 66 (2): 180. 1897; Hosseus in Beih. bot. Chd. 27 II: 480. 1910; *ibid.*, 28 II: 392. 1911; Backer, Schoolfl. Java 416. 1911; Compton in J. Linn. Soc. (Bot.) 41: 13. 1912; Merr., Sp. Blancoan. 172. 1918; Ridley, Fl. Mal. Pen. 1: 634. 1922; Craib, Fl. siam. Enum. 1: 526. 1928; Burkill, Dict. econ. Prod. Mal. Pen. 1: 311. 1935; McMinn & Maino, III. Man. Pacific Coast Trees 246. 1937; Bruggeman, Ind. Tuinb. 224 pl. 220. 1939; van der Pijl in Trop. Natuur 28: 123-126. 1939; *ibid.*, 29: 72-73. 1940; Bremekamp in Trop. Natuur 29: 71-72. 1940; Corner, Ways. Trees Mal. 330 f. 129. 1940; 2nd Ed., 330 f. 129. 1952. — *Bauhinia coromandeliana* DC., Prodr. 2: 515. 1825. — *Bauhinia triandra* Roxb., Fl. ind., ed. Carey, 2: 320. 1832; ed. Clarke, 345. 1874. — *Bauhinia castrata* Blanco, Fl. Filip. 331. 1837. — *Phaseva purpurea* Benth. in Pl. Jungh. 1: 262. 1852; Miq., Fl. Ind. bat. 1 (1): 60. 1855.

7a. Var. PURPUREA.

Bauhinia purpurea var. *a genuina* Kurz in J. As. Soc. Bengal 45: 288. 1876.

A (tree-like) shrub. Leaves ovate, often broader than long, $\frac{1}{4}$ — $\frac{1}{2}$ bifid, rigidly chartaceous, 11-nerved; 8—12(—16) cm across; base broadly cordate to rounded; top-lobes rounded to obtuse (sinus wide) or acutish; glabrous, or on the lower surface locally sparsely, minutely puberulous; petioles glabrous or with few puberulous hairs, about 3 cm long; stipules 3 mm long, acute, nearly glabrous, nearly intrastipular. Flowers in simple or branching, terminal or lateral, few-flowered racemes, on short (about

1—2 cm long) pedicels; bracts and bracteoles 1—2 mm long, ovate, acute, like the pedicels and buds olivaceous, velvety tomentose (intra-bracteolar trichomes present). Buds more or less fusiform, 4—5-angulate or winged, the wings or rims at the top twisted. Receptacle 7—12 mm long. Sepals coherent to a spathaceous, recurved limb, 20—23 mm long. Petals oblong-lanceolate, obtuse, glabrous, somewhat crisped, 3—4 cm long (including the claw), widely different in size; lamina narrowly decurrent along the long, on edge pilose claw. Stamens 3 perfect; filaments 4.5 cm long, at the base shortly connate and appressedly puberulous; anthers 6 mm long, white, splitting lengthwise; staminodes capillary, 5—6, glabrous, 6—10 mm long, connate by a membrane. Ovary long-stiped, narrow, laterally glabrescent but (at first) densely olivaceous tomentose on the thick suturae, stipe, and style; stigma the (somewhat) broadened end, flat or sunken, not swollen. Pods strap-shaped, not septate, flat, 20—25 cm long, 2—2.5 cm wide, glabrous, irregularly but shallowly veined; seeds flat, orbicular, imbedded in pulp, about 0.5 cm across, exalbuminous; funicular branches only 2 mm long.

TYPE.—L 920.278-111 (neotype).

DISTRIBUTION.—South-eastern Asia. Cultivated in Malaysia, south-eastern Asia, and along Pacific Coast.

ECOLOGY.—At 0—200 m altitude. Flowers throughout the year. Petals pinkish or reddish (centre white), also described as "hyacinth-purple, the standard with blood-red centre and base." Often also purple-dotted or striped. Filaments whitish, purple-tinged, or pale pink, ovary sometimes with a basal and a terminal blood-red patch. — The outmost intrapetiolar trichome develops into an erect, subulate, 1—2 mm long, spine-shaped (but not rigid), tardily caducous, outgrowth. The inflorescence may increase to over 25 cm in length when no pollination takes place. — The receptacle or "tubular nectary" was pictured and described by A. Fahs (*in Bot. Gaz.* 113: 465, 467 *fs.* 8, 9, 1952). — The flowers are softly and sweetly fragrant. — Van der Pijl (MS.) studied the increase in the number of veins in the leafhalves in the seedling. He indicated by " $\frac{1}{2}$ " a vein which was visible but included in the thickened margin. He found: 1st leaf (cataphyll): 1, $1\frac{1}{2}$, or 2; 2nd leaf: $1\frac{1}{2}$, 2, or 3; 3rd, 4th, 5th leaf: 3; 6th, 7th leaf: 3 or 4; adult leaves: 5. The seedling anatomy was studied by Compton (*l.c.*) — Trichomes (glands?) are sometimes found on the margin of the connecting membrane between the filaments.

LOCAL NAMES.—Tapak kuda (Mal. Pen.), aroj (ki) kupu kupu (Sundanese), suwoto (Javanese), lupit (British North Borneo), snijbonenboom (Dutch), mariposa (Guam), orchid tree and purple bauhinia (English).

USES.—A common ornamental shrub. Juice or powdered young leaves applied against coughs. Young leaves chewed with sirih. Bark and branches contain a tough fibre used as ropes. Regarding its use in the Malay Peninsula, Burkill (*l.c.*) remarks: "the leaf is used for poulticing sores and boils." He further states: "Such good as the poulticing does is probably the work of tannin. Tannin, at any rate, is known to occur in the bark which is sometimes used, in India, for tanning; and a decoction of it is taken to stop diarrhoea. On the other hand, the flowers are said

to be a laxative, and are used in curries and pickles. Gum runs from the bark at times. The wood, when it can be got of sufficient size, is converted into agricultural implements."

Merrill was at first of opinion that *Bauhinia castrata* Blanco represented *B. malabarica* L. (female plant), but changed his view later on, stating (Sp. Blancoanae no. 1050. 1918) that it was referable to *B. purpurea* L. as "Blanco's description conforms closely to the characters of the Linnean species." I admit that Blanco may have had in mind *B. purpurea* but I wish to point out that Blanco described the calyx as quinquepartite, which is decidedly not conform to the bipartite spathaceous calyx of *B. purpurea*. It is in conformity with that of *B. malabarica*. The description of the leaves may equally well be applied to both, and I never saw in *B. purpurea* the staminodes bearing reduced anthers (nor did Roxburg, Fl. ind., ed. Clarke, 345. 1874) as they are said to do in Blanco's description.

De Candolle (Prodr. 2: 515. 1825) reduced a plant from Timor to *Bauhinia purpurea* L., referring also to Rheede (Hort. malab. 1: pl. 33. 1678). I have examined De Candolle's material (preserved in Herb. Delessert), and found it to belong to *B. malabarica* L. Baker's reduction of *B. purpurea* L. sensu DC. to *B. malabarica* is correct (in Fl. Br. Ind. 2: 277. 1878).

Typification.—In the Linnean Herbarium, London, is one sheet, bearing in Linnaeus's handwriting "6 purpurea." This is the reference to the publication in "Species Plantarum" (1753, p. 375). Savage (Catal. Linn. Herb. 73. 1945) listed this sheet as 525.3.

The sheet carries a twig with three leaves and one, insect eaten, flower. The specimen is evidently what is commonly understood as *Bauhinia tomentosa* L. It still shows the purple patch at the base of the standard, which is characteristic of that species.

Linnaeus's description, poor as it is, is clearly not in accordance with *B. tomentosa*, as currently understood, as regards the flower, but agrees very well with *B. purpurea* L., as we know it now. The specimen in the Linnean Herbarium is, therefore, to be rejected as the type and I suggest that Linnaeus made his description from another, now lost or untraceable specimen.

The only reference made to literature is to Rheede's Chovanna-Mandaru (Hort. malab. 1: 59. 1678) and the species, described there also is best interpreted as *B. purpurea* in the current use.

In Linnaeus's personal copies of "Species Plantarum" no notes are found concerning *B. purpurea*. Under the circumstances it seems best

to appoint a neotype for *Bauhinia purpurea* L. and I select: Merrill, Sp. Blancoanae no. 1050 (L 920.278-111).

7b. Var. *corneri* de Wit, var. nov.

Bauhinia rosea Corner, Ways. Trees Mal. 380 1940, pro spec., descr. angl., inval. publ. (non Miq. nec Kurz).

Differt foliis 7—9-nervis, petalis pallide subroseis, ungui albis, tamen ungui vexilli rubescente post anthesim, ovarii stipite alba.

TYPE.—Furtado s.n., Nov. 19, 1935, Bot. Gard. Singapore (holotype; SING).

DISTRIBUTION.—Cultivated in the Malay Peninsula.

Corner published *B. rosea* in 1940; the name *B. rosea* had been published twice before (by Miquel, 1844, and by Kurz, 1873) for other species. As Corner gave no Latin analysis, the name had no standing for purposes of priority. I name and describe Corner's taxon anew and adopt it as a variety of *B. purpurea*, possibly of horticultural origin. The holotype was collected from a treelet said to have been introduced from Surinam.

7c. Var. *violacea* de Wit, var. nov.

Bauhinia violacea Corner, Ways. Trees Mal. 383. 1940, pro spec., descr. angl., inval. publ.

Differt a *B. purpurea* var. *purpurea* petalis angustioribus violaceis, unguisque cinnabareo.

TYPE.—Henderson s.n., Sept., 1935, Bot. Gard. Singapore (holotype; SING).

Corner published *B. violacea* as a species, mentioned as country of origin tropical America, and added "probably only a variety of *B. purpurea*." It is certainly not a distinct species and I have adopted it as a variety; it seems probable that it is of horticultural, possibly hybrid, origin. The holotype was collected in the Botanic Gardens, Singapore, from a shrub said to have been received from Florida.

Bünnemeijer collected at Tandjungpinang (Rhio Archipelago), on the beach and along roads, a specimen with very deeply cordate, 13-nerved, orbicular leaves, which probably belongs here.

8. BAUHINIA TOMENTOSA L.

Bauhinia tomentosa Linnaeus, Sp. Pl. 375. 1753; Burman, Fl. ind. 94. 1768; Willd., Sp. Pl. 2: 511. 1799; Ham. in Trans. Linn. Soc. 13: 498-499. 1822; DC., Prodr. 2: 514. 1825; Wight & Arn., Prodr. Fl. Pen. Ind. or. 295. 1834; Korth. in Verh. nat. Gesch., Bot. 85. 1841; Hassk., Pl. jav. rar. 410. 1848; Benth. in Pl. Jungh.

261. 1852; Miq., Fl. Ind. bat. 1 (1): 75. 1855; Baker in Hook. f., Fl. Br. Ind. 2: 275. 1878; Trimen, Fl. Ceylon 2: 116. 1894; Prain in J. As. Soc. Bengal 66 (2): 178. 1897; Backer, Schoofl. Java 417. 1911; Compton in J. Linn. Soc. (Bot.) 41: 14. 1912; Heyne, Nutt. Pl. Ned. Ind., 2de Druk, 737. 1927; Corner, Ways. Trees Mal. 332. 1940; *ibid.*, 2nd Ed., 382. 1952; Bor & Raizada in J. Bombay nat. Hist. Soc. 42: 4. pl. 1940; Quisumbing, Med. Pl. Philip. 368. 1951. — *Bauhinia pubescens* DC., Mém. XIII Lég. 483. 1825.

An erect shrub, about 4 m tall; young parts rusty woolly pubescent. Leaves subrotundate, usually somewhat broader than long, to nearly $\frac{1}{2}$ bifid, chartaceous, 7—9-nerved, 3—7 cm across; base rounded, truncate or shallowly cordate; top-lobes broadly rounded; upper surface glabrous, lower, loosely brown pubescent; petiole grooved or angular, pubescent, 1.5—3 cm long; stipules linear, about 1 cm long. Flowers 2 (1—3) in an inflorescence, on 8—12 mm long pedicels; bracts and bracteoles linear, subulate, 4—7 mm long; infrabracteolar trichomes absent. Buds fusiform, apiculate, puberulous. Receptacle campanulate, approximately 5 mm long. Calyx-limb spathaceous, 18—22 mm long. Petals very broadly ovate, rounded, yellow, 4—5.5 cm long, not clawed, glabrous. Stamens 10 perfect; filaments 1—2 cm long, free, glabrous except for the woolly pubescent base; anthers narrow, 3—4 mm long. Ovarial stipe connate with the larger part of the receptacular wall, glabrous; ovary densely tomentose; style in the lower half sparsely pubescent, towards the stigma glabrous; stigma the broadened end. Pod at first pubescent, later on glabrous, (when ripe) without raised suturæ, septate, linear, 7—15 cm long, about 1.5 cm broad; seeds laterally compressed, brown; nearly 1 cm through, albuminous; funicular branches about 1 mm long.

TYPE.—Cultiv. Bogor Bot. Garden I.B. 9a, (neotype; L 950.287-613).

DISTRIBUTION.—Indigenous to the south-eastern Asiatic continent. In Malaysia cultivated.

ECOLOGY.—The flowers are with or without a dark purple blotch on the vexillum, the petals remain imbricate during anthesis and finally turn pallid pink. Korthals (*l.c.*) was mistaken in believing that the species occurred wild in Java. — Compton (*l.c.*) studied the seedling.

LOCAL NAMES.—Tajuman (Javanese); tali kandjo (Sundanese); bahobaho (Philippines); yellow bauhinia, St. Thomas tree (English).

USES.—A favoured garden shrub, flowers throughout the year. In India the root-bark is applied as a remedy against intestinal complaints and also as a poultice on ulcers; the flowers against dysentery. The seeds are pressed in India, and produce an excellent fat oil. "The fine-grained white wood is used for handles, sheaths, weapons, etc. Vordeman (*ex* Heyne, *l.c.*) also noted that its pounded, sour-tasting leaves, mixed with "sajurasem," were applied to ulcers (Madura).

Backer noted (MS.) that in Java occurred two varieties for which he proposed α *concolor* and β *maculata*. They are best distinguished as forms (*forma*), the first, having all petals concolorous and pallid yellow, not discolouring towards the end of anthesis (*forma concolor* Backer *ex de*

Wit, *f. nov.*; petalis concoloratis pallide-flavis), the second, which has the vexillum with a dark purple blotch and the flowers discolouring towards the end of anthesis (forma *tomentosa* Backer ex de Wit, *f. nov.*; vexillo purpureo-maculato denique rubescente). Hamilton (*l.c.*) noted a similar form in Calcutta.

There is no specimen indicated as *Bauhinia tomentosa* L. in the Linnean Herbarium. I appoint as a neotype a specimen cultivated at Bogor (Buitenzorg).

The record by De Candolle (*l.c.*) is based on a specimen of *B. hirsuta* (Herb. M. E. Moricand, Stefano, at Geneva) collected by Labillardière in Java.

9. BAUHINIA VARIEGATA L.

Bauhinia variegata Linnaeus, Sp. Pl. 375. 1753; Burman, Fl. ind. 94. 1768; Ham. in Trans. Linn. Soc. 13: 494-497. 1822; DC., Prodr. 2: 514. 1825; Wight & Arn., Prodr. Fl. Pen. Ind. or. 296. 1834; Zoll. in Nat. geneesk. Arch. Neerl. Ind. 3: 69. 1846; Hassk., Pl. jav. rar. 409. 1848; Kurz, For. Fl. Br. Burma 1: 397. 1877; Baker in Hook. f., Fl. Br. Ind. 2: 284. 1878; Prain in J. As. Soc. Bengal 66 (2): 505. 1897; Backer, Schoofl. Java 416. 1911; Compton in J. Linn. Soc. (Bot.) 41: 12. 1912; Gagnep. in Fl. gén. Indo-Chine 2: 145. 1913; Bamber, Pl. Punjab 22. 1916; Corner, Ways. Trees Mal. 382. 1940; *ibid.*, 2nd Ed., 382. 1952. — *Bauhinia variegata* (L.) Willd. sec. Roxb., Fl. ind., ed. Carey, 2: 319, ed. Clarke, 344. 1874. — *Phanera variegata* (L.) Benth. in Pl. Jungh. 2: 262. 1852; Miq., Fl. Ind. bat. 1 (1): 60. 1855. — *Bauhinia candida* Aiton, Hort. kew. 2: 49. 1789; Willd., Sp. Pl. 2: 510. 1799; DC., Prodr. 2: 513. 1825; Roxb., Fl. ind., ed. Carey, 2: 319. 1832; ed. Clarke, 344. 1874. — *Bauhinia variegata* var. *candida* Corner, Ways. Trees Mal. 383. 1940; *ibid.*, 2nd Ed., 383. 1952.

Chovanna-Mandaru Rheede, Hort. malab. 1: 57 pl. 32. 1678.

9a. Var. VARIEGATA.

A tree, 5—10 m tall, without tendrils; young parts grey puberulous. Leaves broadly ovate to often broader than long, to $\frac{3}{4}$ bifid, (sub)coriaceous, 11—13-nerved, 6—14 cm across; base cordate; lobes broadly rounded; upper surface smooth, more or less dull, lower glaucescent, finely puberulous; petiole sturdy, puberulous, 2.5—3.5 cm long; stipules apparently small, early dropping. Flowers in few-flowered, very short, grey tomentose racemes, on thick, striate, puberulous, 1.5—2 cm long pedicels which merge gradually into the receptacle; bracts and bracteoles ovate, pubescent, short, very early caducous (intra-bracteolar trichomes present). Buds fusiform, turgid, gradually tapering to a sometimes minutely crested top. Receptacle striate, 1—2.5 cm long, tomentellous, often with scattered, glandular hairs. Sepals coherent to a spathaceous, about 3 cm long limb. Petals unequal, more or less clawed, up to 5 cm long and 3 cm wide, all (broadly) (ob)ovate, glabrous, sometimes more or less crisped. Fertile stamens 5; filaments slender, glabrous, about 4 cm long; anthers comparatively small, elliptic, 5 mm long; reduced stamens and staminodes (the

inner whorl) 5, capillary, $\frac{1}{2}$ as long as the fertile ones. Ovary on a 1.5 cm long, slender, pubescent stipe, woolly pubescent mainly on the suturae and a rim on the short style; stigma small, knob-shaped. Pod strap-shaped, not septate, up to 30 cm long and about 2.5 cm wide, nearly smooth, about 12—26-seeded; seeds flat, orbicular, about 1.5 cm across, imbedded in pulp, exalbuminous, brown; funicle flat, truncate, with very short funicular branches.

TYPE.—L 908.112-142 (neotype).

DISTRIBUTION.—Possibly a native of China. Cultivated in Malaysia.

LOCAL NAMES.—Tali kandjo beureum (Sundanese), variegated bauhinia (English), Buddhist bauhinia (American).

ECOLOGY.—Flowering throughout the year. Flowers purple-blotched or striped, often variegated with yellow, rarely white. Hamilton (*l.c.*) says that it stands bare when in flower, which is not seen in Indonesia. — The anatomy of the seedling was described by Compton (*l.c.*).

USES.—Cultivated for ornamental purposes. Edaño noted that on Leyte the leaves were good medicine for head-ache: "just apply on forehead."

Linnaeus assigned it to Malabar ("in arenosis"). Backer found it only as an ornamental tree in Java. Both Prain and Ridley do not accept it as indigenous to the Malay Peninsula. It is native to the warmer zones of continental Asia.

Typification.—The description of *Bauhinia variegata* by Linnaeus in "Species Plantarum" (1753, p. 375) agrees with the species as it has been currently interpreted.

In the Linnean Herbarium, London, one sheet (no. 525.2; *cf.* Savage, *Cat. Linn. Herb.* 73, 1945) bears in Linnaeus's handwriting "5 variegata." The specimen is a leafy twig, with young leaves, and there are neither buds nor flowers. The stipules are subulate, 7 mm long. The specimen belongs to *Bauhinia tomentosa* L. and is, as the description by Linnaeus obviously was made from a different specimen, to be rejected as a possible type.

There are three literature references. The second, to Rheede (*Hort. malab.* 1: 57, 1678), evidently is *B. variegata* as currently interpreted; the third reference (Raius, *Hist. Pl.* 1751, 1686) essentially is the same as the second, the latter being based on the former.

I appoint as the neotype of *Bauhinia variegata* L. a collection by the Reporter on Economic Products to the Government of India, no. 12187, Feb. 16, 1897, Bodhupore, Bogra, Bengal (L 908.112-142).

9b. *Var. alboflava* de Wit, *var. nov.*

Bauhinia candida Aiton, *Hort. kew.* 2: 49, 1789. — *Bauhinia variegata* *var. candida* Corner, *Ways. Trees Mal.* 383, 1940.

Varietas *B. purpureae* petalis albis, vexillo sulfureo pro parte centrali; petalis lateralibus anterioribus interdum pro parte flavis; legumine paulo minore, 12—18 cm longo, 2 cm lato.

TYPE.—Kiah s.n., Jan. 25, 1928, Singapore Bot. Gard., Lawn Z (holotype; SING).

Corner may have had in mind the same plant which was first described by Aiton as *B. candida*. He assured me (*in litt.*) to have had no intention to use Aiton's epithet for his variety *candida* in a new combination. As Corner gave no Latin analysis, I preferred, under the circumstances, to use 'albiflora.' This variety may be synonymous with the β variety, indicated by Wight & Arnott (*Prodr. Fl. Pen. Ind. or.* 296. 1834).

The type of *B. candida* "Roxb." is uncertain but may be a specimen preserved at Kew ("N. 403") and this belongs probably here. A representative specimen of *B. candida* "Roxb." is Anderson, N. 28, cultivated at Calcutta. Of Aiton's *B. candida*, which was probably identical with it, no type is extant.

10. BAUHINIA VIRIDESCENS Desv.—Fig. 4

Bauhinia viridescens Desvaux in *Ann. Sci. nat.* 9: 426. 1826. — *Bauhinia timorana* Decaisne in *Nouv. Ann. Mus. Paris* 3: 466. 1834; *Herb. timor. Deser.* 138. 1835; Spanoghe in *Linnaea* 15: 202. 1841. — *Bauhinia tenuis* Spanoghe in *Linnaea* 15: 202. 1841, in syn. — *Bauhinia timoriensis* Decaisne ex Baker in *Hook. f., Fl. Br. Ind.* 2: 276. 1878.

A shrub, 3—4 m tall; young parts glabrous or puberulous; branchlets slender, angulate or grooved. Leaves ovate, sometimes broader than long, usually somewhat more than $\frac{1}{2}$ bifid (sinus wide, midrib produced as a 5 mm long mucro), chartaceous, 7—9-nerved (outer pair very slender), 5—8(—11) cm long, 6—8(—11) cm wide; base broadly cordate; top-lobes rounded to obtuse, slightly tapering; lower surface sooner or later glabrous except for a few sparse hairs along the nerves and near the base, sometimes at first sparsely greyish woolly pubescent; petioles slender, ribbed or grooved, about 3 cm long, in places pubescent when young; stipules ovate-acute to more or less falcate, outside puberulous, about 4 mm long; intrastipular trichomes subulate, less than 1 mm long. Flowers in slender, small, leaf-opposed, narrow, 4—8 cm long racemes, on glabrous, sturdy, 2 mm long pedicels; bracts as long as the pedicels, ovate-acute, sparsely puberulous; bracteoles smaller. Buds fusiform, crested, glabrous, more or less ribbed, 5 mm long. Receptacle turbinate, striate, about 1.5 mm long. Calyx spathaceous, glabrous. Petals ovate, with rounded top, 7—8 mm long (including the about 2 mm long claw), glabrous, thin. Stamens 9—10 the outer whorl about 6 mm long, the inner whorl slightly shorter, most of the filaments free, some half connate, near the base pubescent; anthers 1.5 mm long, narrow. Ovary on a short, free stipe, appressedly tawny



FIG. 4. *Bauhinia viridescens* Desv., flower and pod, $\frac{1}{2}$ \times . — "*Bauhinia brachycarpa* Wall.": pod, $\frac{1}{2}$ \times . — After Wallich 5786 (lower right corner).

pubescent as is the short style; stigma indistinct. Pods 5—7 cm long and nearly 1 cm wide, often at first puberulous, later glabrous, strap-shaped, dehiscent, often short-beaked, delicately veined, about 7-seeded; seeds pea-sized, laterally compressed, albuminous; funicular branches very short, triangular.

TYPE.—Lectotype in Herb. Paris.

DISTRIBUTION.—Malaysia: Timor, Wetar.

ECOLOGY.—In forest, 200—300 m altitude; abundant; flowers white, in April (Wetar, Bloembergen). Elbert collected it in *Eucalyptus* savanna, in rather dry country, on loamy coralline soil (0—50 m altitude). R. Brown secured it at Kupang in 1803 (s.n.; BM).

LOCAL NAMES.—Ai-kaki, kaki-én (Ilwaki).

Bauhinia viridescens seems to have been entirely forgotten after its publication. *Bauhinia timorana* was referred by Spanoghe, and later in "Index kewensis," to *B. racemosa* Lam., to which it is somewhat similar.

Desvaux ascribed *B. viridescens* to "India Orientalis et Timor." I saw in the Paris Herbarium a specimen which agreed in all particulars with

Desvaux's description and may have served as type; I appointed it as the lectotype.

Some specimens from the south-eastern Asiatic continent were described as *Bauhinia baviensis* Drake del Cast. (*in J. Bot.*, ed. Morot, 5: 217. 1891). Gagnepain (*in Fl. gén. Indo-Chine* 2: 147. 1913) declared that these were conspecific with *B. viridescens*, which opinion I support, but I suggest that *B. baviensis* may be adopted as a variety [*B. viridescens* Desv. var. *baviensis* (Drake del Cast.) de Wit, var. & stat. nov.], distinguished by less deeply split leaves, which are appressedly puberulous on the lower surface, and by puberulous inflorescences. As regards *Bauhinia brachycarpa* Wall. (nomen nudum), a name based on Wallich, Cat. 5786

(cf. J. As. Soc. Beng. 66 (2) : 495. 1897), some pods I saw at Kew (Fig. 4) suggest a close relationship with *B. viridescens*.

Bracteolanthus de Wit, *gen. nov.*

Liana cirrhosa, foliis bifoliolatis, stipulis parvis, sine trichomis intrastipularibus. Inflorescentia gracilis, longe racemosa. Receptaculum turbinatum, minimum. Bracteolae circumsepientes alabastrum, maximae, foliaceae. Calyx parte superiore fissus, 2—3-lobatus. Stamina 10, 6—8 antherifera. Filamenta libera. Antherae longitudinaliter dehiscentes. Stipes ovarii liber. Legumen dehiscens.

Giant lianas, with tendrils. Leaf consisting of two free leaflets. Intrastipular trichomes absent. Stipules small, oblong, early caducous. Flowers in long, very slender racemes.

Receptacle turbinate, very short (a few mm long). Bracteoles on top of the pedicels and nearly enclosing the bud, very large, ovate, leafy. Intrabracteolar trichomes minute, possibly glandular. Sepals coherent in 2—3 lobes in the upper half, entirely coherent below. Stamens 10, 6—8 bearing anthers (all or the majority fertile), the inner whorl shorter. Filaments free. Anthers large, splitting lengthwise. Ovarial stipe free from the receptacle. Style comparatively long. Stigma small, capitate. Pods dehiscent.

TYPE SPECIES.—*Bracteolanthus dipterus* (Bl. ex Miq.) de Wit.

DISTRIBUTION.—Borneo.

This monotypic genus is based on *Bauhinia diptera* Bl. ex Miq. It is in particular distinguished by the slender, very probably hanging racemes, the characters of the receptacle and calyx and, in particular, the bracteoles which are exceptional in size and placed on top of the pedicel. Even as dried herbarium specimens it is a spectacular plant. The gender of the generic name is to be masculine in accordance with Rec. 83A.

Bracteolanthus dipterus (Bl. ex Miq.) de Wit, *comb. nov.*—Fig. 5

Bauhinia diptera Blume ex Miquel, Anal. bot. 1: 12. 1850; Prain in J. As. Soc. Bengal 66 (2) : 501. 1897. — *Phanera diptera* Miq., Fl. Ind. bat. 1 (1) : 70. 1855. — *Bauhinia diptera* Collett & Hemsley in J. Linn. Soc. (Bot.) 25: 52. 1890, quoad nom. homonym (non Bl. ex Miq.). *Bauhinia mirabilis* Merr. in Univ. Cal. Publ. Bot. 15: 103. 1929.

A large liana with strong, nearly opposite tendrils; young branches terete, glabrous, light cinnamon. Leaflets ovate, often strongly unequal-sided, with short acuminate to long caudate top, 12—30(—40) cm long, 7—10(—14) cm wide, firmly chartaceous to coriaceous, thinly pubescent on lower surface, ultimately glabrous, glaucous; nerves 4—5, with an extra, short, slender marginal nerve, stout, connected by many conspicuous straight, transverse, secondary nerves; petioles comparatively slender, 6—20 cm long, base and top considerably swollen, the latter produced into a small caducous mucro; stipules oblong, top rounded, outside puber-

ulous, about 7 mm long, about 2 mm wide, early caducous. Flowers in lateral, usually simple, brownish downy racemes 30—40 cm long; bracts leafy, ovate, up to 8 mm broad, up to 13 mm long, tomentose on both surfaces; bracteoles nearly enclosing the bud, on top of 0.5—2.5 cm long pedicels, paired, similar to the bracts but more than 1 cm wide, both often split at the top and in unequal-sized pairs; intrabracteolar trichomes minute, like glandlets among the hairs, on the bracteole. Receptacle turbinate, 3 mm long. Sepals coherent in 2—3, ovate, 15 mm long, acute, partly free lobes, glabrous within, tomentose without. Petals woolly tomentose on the outside except for the top and laterally near the base, not much differing in size, abruptly shortly clawed, about 2.5 cm long (including the 3—5 mm long claw), (ob)ovate. Disc flat, widened. Stamens about 7 antheriferous, free, 5 long (3 *teste* Merrill) (about 2.5 cm) and 5 short (about 1 cm); filaments at the base with a dense tuft of hairs, the longer nearly glabrous; anthers large (about 5 mm long), elliptic. Ovary 7—10-ovulate (on an about 12 mm long, free, glabrous stipe), glabrous with some irregular hairs near the suture; style curving, over 1 cm long; stigma small, capitate. Pods 20 cm long, 4.5 cm broad, glabrous, about 4-seeded, dehiscent; seeds flat, orbicular, about 2.5 cm long, notched at the hilum; albumen very thin; funicle oblique, triangular.

TYPE.—Korthals *s.a.*, Mount Prarawin, Borneo (holotype; L 908.112-117).

DISTRIBUTION.—Malaysia: British North Borneo: Tawao, Elphinstone Prov., Tiaggau R.; Indonesian Borneo (Sungei Bruni, Bukit batu melier, W. Kutei near Kombeng, Bulongan).

LOCAL NAMES.—Lumapak (Tengara), koripit (Kedayan), karapioh (Orang sungei), lapieu (Tidung), lepès (E. Borneo).

ECOLOGY.—On the edge of streams, at low altitude, a large, rather common liana, rope-like between tree tops. The petals are "doughy white on the inner side, the larger are streaked with dark purple, filaments yellowish white" (Merrill). The fruits make an explosive noise when dehiscent.

Endert (W. Kutai) collected it in primary forests, on low-lying plains, where it was rather common; it flowered in November. Elmer (no. 21432) described the stems as "crooked, flat or double-creased or ribbon-like."

USES.—The bean-like fruits are edible when roasted (H. G. Keith).

Miquel added a question mark to the epithet 'diptera' when publishing it in 1850, but accepted 'diptera' without any expression of doubt in 1855 in combination with *Phanera*.

Prain [*in* J. As. Soc. Bengal 66 (2) : 500, 501. 1897] and other authors confused *Bauhinia glabrifolia* Baker (*in* Fl. Br. Ind. 2 : 281. 1878) with *B. diptera* supposing that entirely free leaflets would occur on young plants and root-shoots only; in adult plants the leaflets were believed to be largely united. This is, as regards *B. diptera*, certainly an error. *Bauhinia diptera* has consistently free leaflets and is widely different from *B. glabrifolia*; compare also Macbride (*in* Contr. Gray Herb. II 59: 23. 1919).

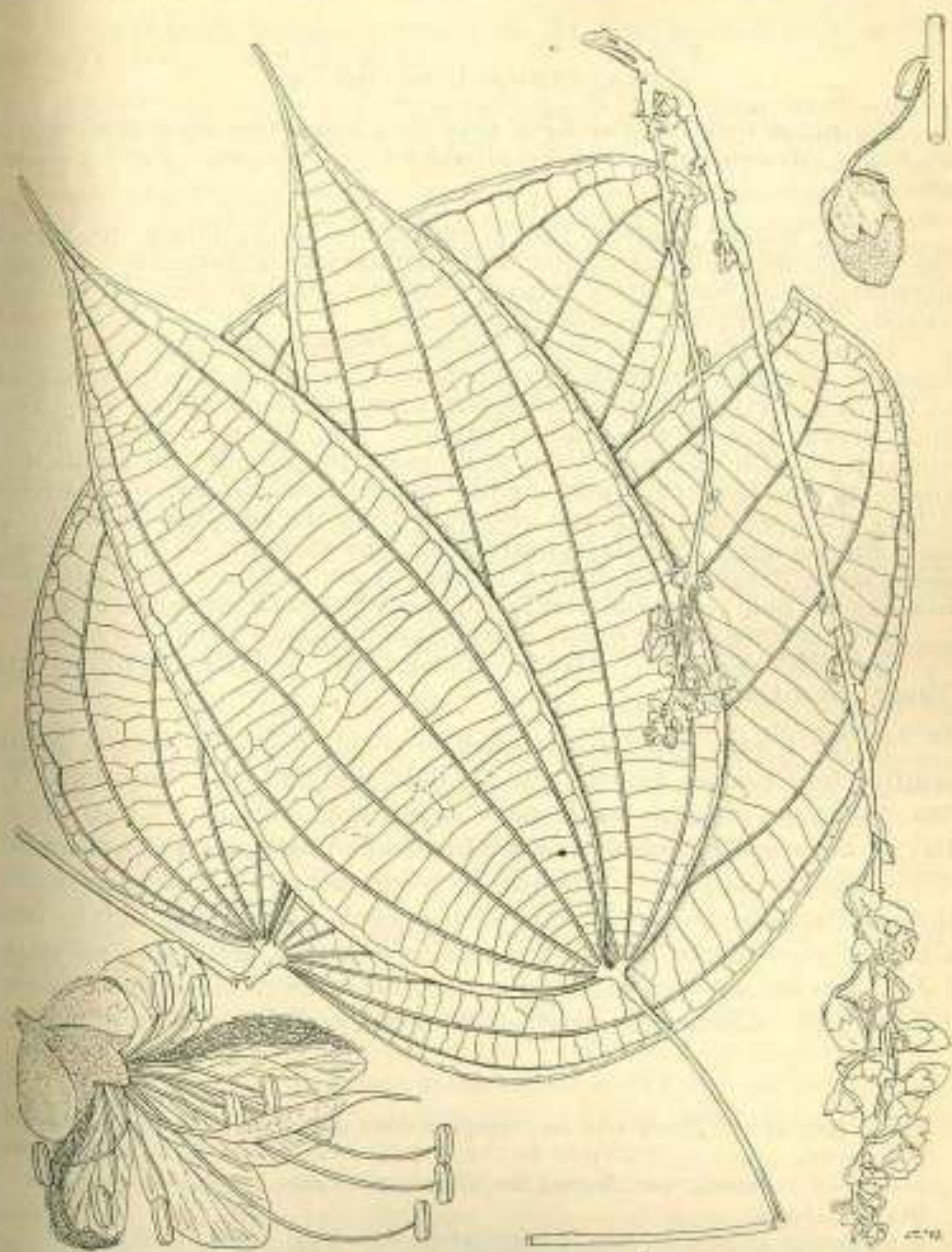


FIG. 5. — *Bracteolanthus diptera* (Bl. ex Miq.) de Wit: leaves and inflorescence, $\frac{1}{2}$ \times ; bud and flower, nat. size.

The holotype of *Bauhinia mirabilis* Merr. (Elmer 21432; A) belongs here.

GIGASIPHON Drake del Cast.

Gigasiphon Drake del Castillo in Grandidier, Hist. Phys. Madagascar 30 (1): 88, 1902. — *Bauhinia* sect. *Gigasiphon* (Drake del Cast.) Harms in Bot. Jb. 55: 55, 1917.

Trees, without tendrils. Leaves entire, not lobed; among the nerves the midrib is the stoutest and with strong lateral branches. Stipules narrowly linear, long acute. Intrastipular trichomes present but not numerous. Flowers large, in short racemes.

Buds not ribbed, more or less fusiform. Receptacle many times longer than the nearly absent or short, thick pedicel, smooth, tubular, not dilated at the base. Bracts and bracteoles very early caducous. Sepals very long and narrow, free or sometimes irregularly more or less coherent in the apical part, with an apical nectary. Stamens 10, (usually) all fertile, the filaments free, the inner whorl slightly shorter. Ovary linear, very long, on a long stipe, connate with and emerging from the receptacle wall. Style long. Stigma small. Pods (very) large, flat, the seeds placed in the centre. Seeds large, flat-orbicular, brown, (always ?) exalbuminous, and imbedded in abundant pulp; seed-coat very hard, thick. Funicular branches long.

TYPE SPECIES.—*Gigasiphon humblotianum* (Baill.) Drake del Cast.

DISTRIBUTION.—East Africa; Madagascar. Malaysia: Philippines; Timor; New Guinea.

So far I have found five species to belong to *Gigasiphon*, a genus typified by *Bauhinia humblotiana* H. Baill. (*in* Bull. Soc. linn. Paris 1: 365, 1874-89) = *Gigasiphon humblotianum* (Baill.) Drake del Cast. (*l.c.*). Harms described *Bauhinia macrosiphon* from Usambara and considered *Gigasiphon* to be either a section or a subsection of *Bauhinia*. In the three Malaysian species the tips of the sepals are twisted tightly into a kind of claw-shaped knot and appear to contain a nectary on anthesis. I do not know whether this is also the case in extra-Malaysian species. The peculiar "Lemurian" distribution of the genus is worthy of notice.

KEY TO THE SPECIES OF GIGASIPHON

1. Petals long-clawed. Receptacle and sepals densely pubescent or tomentose. Ovary glabrescent. 2. *G. dolichocalyx*
1. Petals not or nearly not clawed. Receptacle and sepals puberulous, glabrescent. Ovary glabrous.
 2. Receptacle about 6 cm long. Pedicels about 1 cm long. Stigma knob-shaped.
 3. *G. schlechteri*
 1. *G. anophum*
 2. Receptacle 8-10 cm long. Pedicels about 2 mm long. Stigma indistinct.

1. *Gigasiphon amplum* (Span.) de Wit, *comb. nov.*—Fig. 6

Bauhinia ampla Spanoghe in *Linnaea* 15: 203. 1844; Benth. in *Pl. Jungh.* 264. 1852; Miq., *Fl. Ind. bat.* 1 (1): 76. 1855.

A small tree, up to about 13 m tall; young shoots thinly rusty-puberulous, soon glabrous. Leaves broadly elliptic to ovate, 7(—9)-nerved; 5—12 cm long, 5—9 cm wide; base (shallowly) cordate to truncate; top short-acuminate; upper surface glabrous, lower nearly so except on the nerves and in their axils; petiole up to 3 cm long; stipules linear, sickle-shaped, acute, membranous, about 1 cm long, almost glabrous. Flowers along short, terminal or lateral axes, on indistinct, about 2 mm long, thick pedicels. Buds clavate, top claw-shaped, fugaciously rusty puberulous. Receptacle 8-10 cm long. Sepals 4.5—5 cm long, up to 5 mm wide, acute, flabby, tip swollen. Petals white, obovate, about 5.5 cm long, not clawed. Stamens 10, apparently all perfect; filaments of the outer whorl 5—5.5 cm, of the inner about 4 cm long, glabrous, free; anthers oblong-elliptic, about 1 cm long. Ovarial stipe connate with the wall of the receptacle-tube and emerging at the mouth; ovary about 10-ovuled, glabrous, very slender; stipe glabrous; style about 1 cm long; stigma indistinct, the non-swollen end of the style. Pods large, over 30 cm long, 7—8 cm wide, thin-walled, glabrous, 1—10-seeded; seeds broadbean-shaped, about 2.5 cm across, glossy, brown; funicular rims running along $\frac{2}{3}$ the circumference.

TYPE.—De Voogd 2317 (neotype; BO).

DISTRIBUTION.—Malaysia: endemic in southern and central Timor (Baun to Sufa).

ECOLOGY.—A (small) tree found on rocky slopes, in (secondary) forests on never inundated grounds or along streams from 750 m altitude to near the sea. It seems to be nowhere common. The specimens collected so far suggest that a flush of young shoots appears about November. Flowers follow in the course of April. Pods ripen on lignifying peduncles in the second half of the year. Seeds separated by broad, pulpy septa. A few gland-like bodies occur on the margin of the stipule. Intra-stipular trichomes not numerous.

LOCAL NAMES.—Sikal (southern Central Timor), taèk nasi (Dawang, northern Central Timor).

Spanoghe's *Bauhinia ampla* was based on his specimens, drawing (no. 29), and description. His specimens and his drawing disappeared. Miquel (*l.c.*) appears to have seen no material and copied Spanoghe's description *verbatim*. The name must be interpreted from the description only. Spanoghe described his "*Bauhinia ampla*" as arboreous.

The arboreous Bauhinieae in Timor are *B. acuminata* L., *B. viridescens* Desv., *Ptilostigma malabaricum* Benth., and there is, at Bogor and at Leyden, good material of an unidentified fourth species. Although Spanoghe's description is summarily drafted and even differs from our present white-flowered specimens in the colour of the flower (Spanoghe:

"lilacina, imo intus ochraceo-variegata"), there are nevertheless so many distinctive characters in agreement with the unidentified specimens (collected by Teysmann, Walsh, de Voogd, and through the Forest Research Institute, Bogor) that their identification as "*Bauhinia ampla*" seems unquestionably justified. Especially the exceptionally large pods, which are described by Spanoghe, are convincing proof of the identification.

The midrib of the leaf is the stoutest, contrary to the usual leaf in Bauhinieae, which has the central vein (below the sinus of the emarginate top) more slender than the first lateral nerves or, at best, equally thick. The "amplum" midrib has also strong side-branches, while the midrib in the Bauhinieae leaf usually is only connected with the lateral nerves by slender, transverse veins.

The neotype was collected November 17, 1953, on rocks near Reboki, a fruit-bearing specimen.

2. *Gigasiphon dolichocalyx* (Merr.) de Wit, *comb. nov.*—Fig. 6

Bauhinia dolichocalyx Merrill in Philipp. J. Sci. (Bot.) 3: 231. 1908; *ibid.*, 5: 44. 1910; Bur. Sci. Publ., Manila (Sp. Blancoanae No. 531) 171. 1918; Enum Philipp. fl. Pl. 259. 1923. — *Bauhinia grandiflora* Blanco, Fl. Philipp. 332. 1837; 2nd Ed., 1: 231. 1845; 3rd Ed., 2: 67. 1878 (non Juss. nec Dietr.).

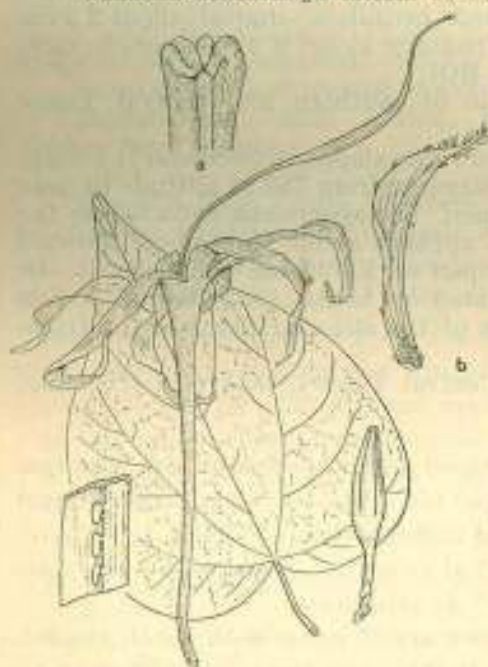


FIG. 6. — *Gigasiphon dolichocalyx* (Merr.) de Wit: flower (without petals), $\frac{1}{2} \times$; young bud, $\frac{1}{2} \times$; section of the ovary, $2\frac{1}{2} \times$. — *Gigasiphon amplum* (Span.) de Wit: a, top of bud; b, stipule.

An about 10 m tall tree. Leaves ovate, entire, glabrous except for the woolly pubescent nerves and axils on the lower surface, shining; 10–14 cm long, 5 + 2-nerved; base cordate; top gradually acuminate; nerves prominent with strong branches. Inflorescence terminal, aggregate, densely fuscous tomentose; bracts ovate, acute, 2 mm long, very early caducous; bracteoles similar. Receptacle long (6–8 cm), tubular, tomentose, merging into the less than 0.5 cm long, thick pedicel, gradually widening towards the mouth. Sepals finally free, at first coherent in places, linear, 4.5–6.5 cm long, 5 mm wide, with thickened tips, pubescent. Petals about 8 cm long, more or less glabrous, long-clawed (claw absent in bud). Fertile stamens 10; filaments

glabrous, 4 cm long or longer; anthers exceeding 1 cm in length. Ovary on a long stipe, early glabrous, style short; stigma globular, small; ovules 8—12. Pod woody, 20 cm long, 7 cm wide, glabrous; seeds 2, round-compressed, shining, about 3.5 cm in diameter.

TYPE.—Merrill, Sp. Blancoanae 531 (neotype; A).

DISTRIBUTION.—Malaysia: Philippines: Luzon (Prov. of Batangas).

ECOLOGY.—On dry slopes at low altitude (Merrill). Flowers in August.

LOCAL NAMES.—Bongalon (Tagalog), malabanot (Tagalog).

The dried specimens suggest that during aestivation a torsion occurs in the receptacle. On dissection of the ovary, the ovules seem to be attached to a lateral rim running lengthwise in the inner ovarial wall. This is caused by the position of the ventral suture, which is, if seen from the outside of the ovary, situated in the bottom of a narrow ventral furrow formed by the protruding ovarial walls. The seeds will thus be placed at some distance from the margins of the pod (*cf.* generic description of *Gigasiphon*).

The young leaves are brown woolly pubescent on both surfaces.

The "Index kewensis" mistakenly referred Blanco's *Bauhinia grandiflora* to *B. variegata* L. (as was also believed by F.-Vill.). It is not *B. acuminata* L. either (*cf.* Merrill, *l.c.*, 1918).

3. *Gigasiphon schlechteri* (Harms) de Wit, *comb. nov.*

Bauhinia schlechteri Harms in Bot. Jb. 55: 55, 1917.

A large tree without tendrils; young parts appressedly puberulous; branchlets terete, glossy, smooth, glabrous. Leaves entire, 5—7-nerved (the midrib stoutest), ovate to oblong, more or less coriaceous, 12—25 cm long 8—10(—12) cm wide; base rounded, truncate or shallowly cordate; top (long-)acuminate; upper surface shining, lower, more or less dull, both glabrous except on the nerves; petioles 1.5—3(—4) cm long, at first rusty puberulous; stipules early caducous, not seen. Flowers in terminal, short, appressedly rusty puberulous, glabrescent racemes; pedicels thick, up to 1 cm long, glabrescent; bracts and bracteoles early caducous. Buds fusiform; tips incurved, claw-shaped. Receptacle 6 cm long, gradually tapering towards the base, striate, finally glabrous. Sepals free, about 5 cm long, linear, reflexed, with an apical nectary, puberulous. Petals obovate, 7—9 cm long, glabrous, claw indistinct. Stamens 10 perfect; filaments decreasing in length, 6.5—5 cm long, slender, glabrous; anthers very narrow, linear, 15 mm long. Ovary very narrow, on a long slender stipe, glabrous; stigma small, vaguely knob-shaped. Full-grown pods unknown, certainly large.

TYPE.—Schlechter 17550 (lectotype; L).

DISTRIBUTION.—Malaysia: North-eastern New Guinea (Djamu R., Sepik R.; Western New Guinea Bernhard Camp; Idenburg R.).

ECOLOGY.—Flowering in the first half of the year. Harms described the flowers as beautiful, white, more or less campanulate. It was found in marshy forests, or rain-forests of river flood-plains, at low altitude (Brass 13951), a 20 m tall tree. Brass noted that the two lower petals were orange-red at the base and the flowers pleasantly fragrant. Docters van Leeuwen observed that cacatoas ate the flowers; I suggest that they may have been attracted by the nectaries in the sepals or by the glandular hairs sometimes present on the buds. — At 50 m altitude, near Albatros Bivouac, Docters van Leeuwen noted that it was a giant tree (trunk circumference 1.45 m above the ground) in heterogeneous primary forest, near the river bank. The base of the inside of the petals and of the stamens was red, the flowers were wide open.

Harms wished to place this species in *Bauhinia* sect. *Pauletia*, but this will never do in view of the five free sepals (non-spathaceous calyx), the ovarial stipe being connate with the receptacular wall, and the essentially different leaf.

The type (first collection cited) was destroyed at Berlin. The above indicated lectotype was collected April 15, 1908, in the forest at the Djamu (North-eastern New Guinea); a flowering specimen.

LASIOBEMA (Korth.) Miq.

Lasiobema (Korth.) Miquel, Fl. Ind. bat. 1 (1): 71. 1855; "*Lasiobema*": Benth. in Pl. Jungh. 263. 1852, in synonymy. — *Bauhinia* subgen. *Lasiobema* Korthals in Verh. nat. Gesch., Bot. 84. 1841; Baker in Hook. f., Fl. Br. Ind. 2: 284. 1878; Prain in J. As. Soc. Bengal 66 (2): 194. 1897, pro sect. *Bauhiniae*. — *Bauhinia* sect. *Loxocalyx* Benth. in B. & H., Gen. Pl. 1: 576. 1865.

Tendrilled lianas. Leaves entire or bilobed; midrib as a rule thickest, with manifest lateral branches. Intrastipular trichomes reduced to a few, minute, gland-like bodies. Flowers small, in simple or compound, slender-stemmed, narrow, never corymbose racemes, numerous.

Receptacle turbinate, open or solid, very small, sometimes absent. Inbracteolar trichomes absent. Buds either globular, with rounded apex, open at the top long before anthesis and then the sepals remaining coherent and their tips exerted like minute teeth from the margin of the truncate calyx, or ovoid and the sepals coherent in 2—3 ovate lobes, while the disc is swollen. Perfect stamens 3; anthers splitting lengthwise; staminodes minute, 2—6 in number. Disc either swollen and the ovarial stipe emerging laterally or (in extra-Malaysian species) from the centre, or not swollen. Stigma small, often merely the ending of the style. Pods small, flat, dehiscent, thin-valved. Seeds few. Funicular branches short, their length less than $\frac{1}{4}$ the circumference of the seed.

TYPE SPECIES.—*Lasiobema scandens* (L.) de Wit.

DISTRIBUTION.—Asiatic continent (East Bengal; Assam, Sikkim; Indo-China; China; Japan). Malaysia: Malay Peninsula, Sumatra, Java, Madura, Sumba.

ECOLOGY.—It is possible that all species are proterandrous. All Malaysian species occur on limestone soils. Suckers or water-shoots may have entirely split leaves (two free leaflets).

Lasiobema is represented by five species (one as a variety) in Malaysia. Type species is *Bauhinia scandens* L. Korthals's text is ambiguous as to whether he proposed *Lasiobema* as a subgenus or as a genus. He made no new combinations and for that reason I adopted the view that *Lasiobema* was first published as a subgenus (not as a section, *cf.* Miquel, *l.c.*).

Bentham (*l.c.*) described a section *Loxocalyx* in *Bauhinia*. This section was based on a single species. "*B. macrostachya* Wall., Catal. n. 5774. *B. scandens* Roxb. Fl. Ind. 2, 326." Bentham quoted "*B. scandens* Roxb.," but actually Roxburgh used "*B. scandens* Willd." and considered Willdenow's name as based on *Folium linguae* Rumph. Bentham cannot be believed to have considered *B. scandens* as based on *Folium linguae* Rumph. (like Roxburgh did) as is evident from his description of section *Loxocalyx*. He meant to adopt *B. scandens* L. (= *B. anguina* Roxb., *op. cit.* p. 328) as the base of his new section and from that species his description was made. Korthals's *Lasiobema*, presumably a subgenus, was based on the same species.

The genus *Lasiobema* clearly has its centre in the Asiatic continent.

Other members of the genus are *Lasiobema harmsianum* (Hosseus) de Wit, *comb. nov.* (basinym, *Bauhinia harmsiana* Hosseus in Fedde, Repert. 4: 290. 1907) and *Lasiobema cardinale* (Gagnep.) de Wit, *comb. nov.* (basinym, *Bauhinia cardinalis* Pierre ex Gagnepain in Lec., Not. Syst. 2: 170. 1912) both of Siam, *Lasiobema championii* (Benth.) de Wit, *comb. nov.* (basinym, *Bauhinia championii* Bentham, Fl. hongkong. 99. 1861); *Lasiobema hunanense* (Hand.-Mazz.) de Wit, *comb. nov.* (basinym, *Bauhinia hunanensis* Handel-Mazzetti, Symb. sin. 7: 541. 1933); *Lasiobema esquirolii* (Gagnep.) de Wit, *comb. nov.* (basinym, *Bauhinia esquirolii* Gagnepain in Lec., Not. Syst. 2: 171. 1912) of China, *Lasiobema japonicum* (Maxim.) de Wit, *comb. nov.* (basinym: *Bauhinia japonica* Maximowicz in Bull. Acad. Pétersb. 18: 401. 1873) of Japan, and there are more.

Bentham (in Hook. J. Bot. 4: 78. 1852) suggested that *L. championii* was to be placed in *Phanera*, because the "fleshy disc" held a different position from that found in the type species. In correlation with other

characters, the presence of a swollen disc is (in Malaysian Bauhinieae) characteristic of *Lasiobema*, not its position.

Lasiobema comprises two distinct taxa, as may be seen from the key. It is possible that in the future the taxon with the non-swollen receptaculum and densely tomentose ovary, which comprises a considerable number of species, mainly on the Asiatic continent, will prove to be better treated as a genus.

KEY TO THE SPECIES OF LASIOREMA

1. Disc swollen. Ovary glabrous.
 2. Buds spherical, rounded. Sepals triangular, free, 0.5 mm long. Leaves bifid, often to close to the petiole. Pedicels 2-4 mm long, not capillary. Staminodes minute, 2,, 3. *L. scandens* var. *horsfieldii*
 2. Buds ovoid, acute. Sepals coherent in 2-3 lobes. Leaves shallowly, at most $\frac{1}{2}$ bifid.
 3. Pedicels up to 2 cm long. Stamens about 5 mm long. Receptacle turbinate, 1 mm long. Staminodes 5-6. Leaves very shallowly bifid. 1. *L. curtisii*
 3. Pedicels about 5 mm long. Stamens about 1 cm long. Receptacle obsolete. Staminodes 2. Leaves $\frac{1}{2}$ - $\frac{1}{2}$ bifid. 2. *L. flavum*
1. Disc not swollen. Ovary densely tomentose.
 4. Calyx 4 mm long. Racemes rusty puberulous. Bracteoles minute scales. Pedicels 20-25 mm long, glabrous. 4. *L. strychnoideum*
 4. Calyx 2 mm long. Racemes grey silky pubescent. Bracteoles delicate threads. Pedicels 16-20 mm long, pubescent. 5. *L. tubicalyx*

1. *Lasiobema curtisii* (Prain) de Wit, *comb. nov.*—Fig. 7

Bauhinia curtisii Prain in J. As. Soc. Bengal 66 (2): 195. 1897; Ridley in J. As. Soc. Str. Br. 59: 98. 1912; Fl. Mal. Pen. 1: 633. 1922. — *Bauhinia calcicola* Craib in Kew Bull. 1927: 387.

A woody climber; tendrils short, circinate; young branchlets grey puberulous, soon glabrous and glossy. Leaves ovate-(oblong), 5(-7)-nerved, $\frac{1}{10}$ - $\frac{1}{5}$ bifid, chartaceous, 5-10 cm long, 2.5-6 cm wide; base truncate to rounded or shallowly cordate; upper surface glossy, lower sparsely hirsute only when young and on the nerves more persistently pubescent; petiole 1-3.5 cm long, slender, grooved, more or less pubescent; stipules very small, obliquely ovate, acute, more or less glabrous. Flowers small, in terminal or lateral, (or compound), lax, about 10 cm long, greyish puberulous racemes, on up to 2 cm long capillary, puberulous pedicels; bracts minute, nearly glabrous, caducous; bracteoles similar, slightly smaller. Buds ovoid, acute. Receptacle solid, about 1 mm long, not dilated. Sepals coherent in 2 or 3, 2-3 mm long lobes. Petals spatulate to orbicular, sparsely puberulous externally, white or pale green, crisped, very unequal, 5-7 mm long, including the about 0.5 mm

long, more or less pubescent claw. Stamens 3 fertile; filaments stout, 4—5 mm long, glabrous; anthers splitting longitudinally, very early caducous; staminodes 5—6, minute. Ovary shortly stiped, emerging laterally from the raised disc, glabrous; style short; stigma not swollen. Pods elliptic or strap-shaped, smooth, glossy, glabrous, flat, thin-valved (calyx lobes persistent on the stipe), beaked, about 5 cm long, 1.5 cm wide; seeds (2—)3—6, flat, 1 cm in diameter; funicle short-triangular, suddenly broadening into the large hilum, its branches short.

TYPE.—Curtis 1682 (lectotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Kedah (Langkawi Is.; Pulau Bayang Bunting; Gunung Kerian; Alor Star; Trutow), Perak (Tambun Ipoh). Lower Siam: Pulau Panji, Pattani.

ECOLOGY.—From the sea-shore to about 150 m altitude. Flowers pale green or yellow, May to August, ripe pods November to January.

Common on limestone. The anthers dehisce when the bud opens, and drop very soon after.

I found Kerr 7718, the type (Kew) of *Bauhinia calcicola*, to belong here.

2. *Lasiobema flavum* de Wit, *sp. nov.*—Fig. 8

Distincta floribus comparate magnis. Receptaculum tubulare ad discum tumentem incrassatum.

A climber; tendrils appressed rufous, glabrescent; young shoots rusty puberulous; branchlets grooved. Leaves ovate to orbiculate, $\frac{1}{2}$ — $\frac{3}{4}$ bifid, often broader than long, 9-nerved (nerves slender but strongly branching, slightly raised on the upper surface, on the lower not very prominent, more or less glabrous), 6—8 cm long, 7—11 cm wide; top-lobes blunt to subacuminate, the tip subfalcate (sinus wide); base shallowly broadly cordate; upper surface glabrous except near the basal joints, lower soon glabrescent, puberulous among the nerves near the petiole; petiole about 3 cm long, slender, at first woolly pubescent, finally glabrous; stipules not seen. Flowers in slender-stemmed, narrow, 12—18 cm long, tawny pubescent racemes, which are solitary or, as a rule, placed in pairs on top of side-branchlets; pedicels about 5 mm long, pubescent; bracts ob-



FIG. 7. *Lasiobema curtisii* (Prain) de Wit: leaves and inflorescence, 5 ×; pod, $\frac{1}{4}$ ×; flower and stipule, 2 ×.

long-acute, with a central glabrous zone, about 2 mm long; bracteoles similar, half as long, placed in the lower half of the pedicels. Buds ovoid, blunt. Receptacle seemingly absent (not tubular), but swollen to a strongly raised disc. Sepals about 4 mm long, ovate, finally not quite free and more or less reflexed, externally tawny pubescent. Petals obovate to broadly

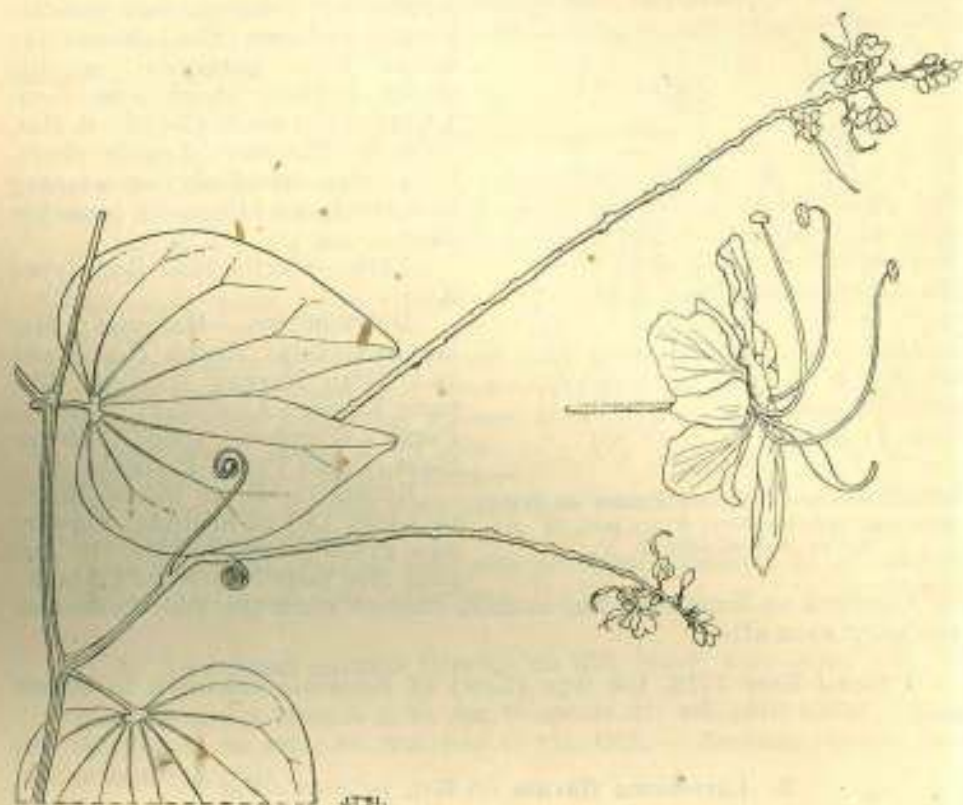


FIG. 8. *Lasiobema flavum* de Wit: leaves and inflorescence, $\frac{1}{2} \times$; flower, $4 \times$.

elliptic, gradually tapering towards the base, externally golden pubescent, about 8 mm long (including a 2 mm long claw). Stamens about 1 cm long; filaments glabrous, rather slender; anthers broadly elliptic, early caducous, 0.5 mm long; staminodes minute, subulate. Ovary on a glabrous stipe (emerging laterally from the swollen disc), glabrous, about 7-ovulate; style glabrous, slightly longer than the stipe; stigma inconspicuous.

TYPE.—M. R. Henderson, Sing. Field 29.146 (holotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Langkawi Is. (P. Dayang Bunting).

ECOLOGY.—Flowers pale yellow, in November. Occurring on limestone at sea-level.

3. *Lasiobema scandens* (L.) de Wit, *comb. nov.*Var. *horsfieldii* (Watt ex Prain) de Wit, *comb. nov.*

Bauhinia scandens Linnaeus, Sp. Pl. 374, 1753 (Rheede, Hort. malab. 8: 57 pls. 30, fl. 1688, Naga-mu-valli; non Roxb., see Blanco); Burman, Fl. ind. 94, 1768; Prain in J. As. Soc. Bengal 66 (2): 94, 1897; Heyne, Nutt. Pl. Ned. Ind., 2de Druk, 737, 1927. — *Phanera scandens* (L.) Rafin., Sylv. tell. 122, 1838. — *Bauhinia anguina* Roxb., Hort. beng. 31, 1814, nomen nudum; Pl. Coromand. 3: 82 pl. 295, 1819; Fl. ind., ed. Carey, 2: 328, 1832; DC., Prodr. 2: 518, 1825; Wight & Arn., Prod. Fl. Pen. Ind. or. 298, 1834; Baker in Hook. f., Fl. Br. Ind. 2: 284, 1878; Trimen in J. Bot., Lond. 23: 144, 1885; Gagnep. in Fl. gen. Indo-Chine 2: 138, 1913; Ridley, Fl. Mal. Pen. 1: 634, 1922; Bor & Raizada in J. Bombay nat. Hist. Soc. 42: 7-9 pl. 1940. — *Lasiobema anguinum* (Roxb.) Korth. ex Miq., Fl. Ind. bat. 1 (1): 71, 1855. — *Bauhinia debilis* Hassk. in Tijdschr. nat. Gesch. Phys. 10: 149, 1843. — *Phanera debilis* (Hassk.) Miq., Fl. Ind. bat. 1 (1): 69, 1855. — *Phanera bifoliata* Miq., Fl. Ind. bat. 1 (1): 69, 1855, in adn.

Lasiobema horsfieldii Miq., Fl. Ind. bat. 1 (1): 71, 1855. — *Bauhinia anguina* var. *horsfieldii* Watt ex Prain in J. As. Soc. Bengal 66 (2): 194, 1897; Craib in Aberd. Univ. Stud. No. 57: 75, 1912; Gagnep. in Fl. gen. Indo-Chine 2: 138, 1913; Backer, Behn. Fl. Java, Nooduitg. 5 (Fam. 118): 19, 1941. — *Bauhinia horsfieldii* (Miq.) Macbride in Contr. Gray. Herb. II No. 59: 23, 1919.

A giant liana up to 30(—50) m long, with more or less opposite tendrils; young stems rusty pubescent. Leaves ovate, entire or split sometimes into 2 nearly free, distinctly asymmetrical leaflets, chartaceous to subcoriaceous, 7-nerved; 5—12 cm long, 6—10 cm wide; base cordate; toplobes blunt, acuminate; on both surfaces glabrous or nearly so (nerves sparsely pubescent on lower surface); petiole slender, 3—5 cm long, puberulous to glabrescent; stipules dropping early, less than 0.5 cm long, ovate, mucronate. Flowers small, in terminal, compound, many-flowered puberulous, up to 25 cm long, very narrow racemes, originating partly from the axils of the upper leaves, on 2—4 mm long, glabrous or puberulous pedicels; bracts 2 mm long, like the bracteoles (1 mm long) puberulous, linear. Buds spherical, puberulous. Receptacle very nearly or entirely filled by the disc. Sepals triangular, sparsely puberulous, with a blunt swollen tip, 0.5 mm long; disc swollen, deeply grooved, puberulous. Petals obovate, yellowish white, about 3 mm long (including the very short claw), externally with a puberulous median zone, the vexillum smallest. Stamens 3 perfect (opposed to the 3 anterior calyx teeth); filaments 4—5 mm long, glabrous; anthers ellipsoid, splitting longitudinally; staminodes 2, minute (opposite the 2 posterior calyx teeth). Ovary on an about 1 mm long stipe, glabrous, inserted laterally into the disc; style slender, glabrous, about 1 mm long; stigma indistinct. Pods flat, short-elliptic, thin-valved, 3—4 cm long, 1.5—2 cm wide, 1—2-seeded; seeds broadbean-shaped, about 6 mm in diameter, exalbuminous.

TYPE.—Horsfield s.n. ("L. 169"), Java (holotype; K).

DISTRIBUTION.—India and Indo-China, possibly Ceylon, Malaysia: Sumatra (Pulu Weh; Atchin; M. Singalang), throughout Java, Madura, Sumba (near Waikolo).

LOCAL NAMES.—Lulin, plole (Java); areuj (or ki) kukupu, a. tilil or tilul, a. tuku taka (Sundanese); ping keping (Mad.); lolodakkoh (Sumba); snake climber (English).

ECOLOGY.—Prain (1897) recorded the species (within which the variety is distinguished by larger pods) from India and Indo-China, the variety from the Malay Archipelago. He was uncertain whether the species or the variety occurred in the Malay Peninsula. Ridley (1922) correctly denied the presence in the Peninsula of both the species and the variety. Trimen (1885) thinks it possible that in Ceylon it is an introduction. He observed: "the young trailing shoots run extensively over the ground and root at the joints; the plant is thus easily propagated either accidentally or by intention." (cf. Rheede, *op. cit.* pl. 29 and Hasskarl's *Bauhinia debilis*). — Old stems are broadly flattened, the sinuated central (primary) stem-zone brings about an alternately deeply concave and convex median zone (cf. Rheede, also Trimen, who described this as "chain-cable like"). Backer (MS.) saw very old stems in Java which were 15 cm broad. Bor & Raizada (*l.c.*) state that the majority of the sap vessels are in the corrugated part so that if tension is applied the strain is taken by the margins and the ascent of sap is not impaired. I wonder whether this ingenious idea is founded on fact. The young circinate tendrils are in pairs but not really opposite. One tendril (the more slender one) is often shed; sometimes the side branchlet changes into a thick furcate tendril. — Backer (MS.) stated that the species occurred all over Java (frequent near Batavia), from sea-level to about 800 m altitude, mainly on forested limestone hills, and that it was often locally abundant in particular in regions subject to a pronounced dry season. It seems to be often overlooked as it flowers rather rarely (April and May). Backer found the crown white when in flower and the flowers fragrant. — The funicular branches are nearly half as long as the circumference of the seed. Van der Pijl (MS.) noted that in young plants the leaves fold at night, but only when the top is considerably deeper bifid than $\frac{3}{4}$ the length of the leaf.

USES.—It is said to produce strong ropes. To cure a severe cough, the juice from the stem is swallowed or young shoots are chewed with leaves and sirih; also taken as a powder when dried. (Record uncertain.)

Stickmann (Amoen. Acad. 18. 1754), in his interpretation of Rumphius's "Herbarium amboinense," identified Linnaeus's *B. scandens*, which was based solely on Rheede's Nagamu-valli (see p. 460), with Rumphius's *Folium linguae*, a mistake published at first under the authority of Linnaeus and later adopted in his own writings. This resulted in much (unnecessary) confusion: for *B. scandens* L. the name *B. anguina* Roxb. was often used, while the latter was only a synonym.

MacBride (*l.c.*) claimed specific rank for the variety *horsfieldii* on

account of the size of the pods, the definitely pilose inflorescence (not faintly puberulous), and the leaves puberulent beneath (instead of being glabrous). Examination of an adequate series of specimens shows that these differences (except the size of the pods) do not really exist.

4. *Lasiobema strychnoideum* (Prain) de Wit, *comb. nov.*

Bauhinia strychnoidea Prain ex King in J. As. Soc. Bengal 66 (2): 195. 1897; Ridley, Fl. Mal. Pen. 1: 633. 1922.

A climber or climbing shrub 20—30 m long, but stems only 2—3 cm in diameter; young branchelets glabrous, sulcate; tendrils glabrous. Leaves ovate to nearly lanceolate, entire, (sub)coriaceous, 5-nerved (the outer pair very slender, the inner almost as strong as the midrib); 6—10 cm long and 3—6(—7) cm wide; base rounded to cuneate; top more or less acuminate; upper surface glossy, both surfaces entirely glabrous, lower surface dull; petiole slender, 1—2 cm long, glabrous; stipules not seen. Flowers small, in dense, many-flowered, slender, appressedly rusty puberulous, 20—30 cm long, up to 6 cm wide racemes on top of short branchlets, on spreading, slender, 2—2.5 cm long, glabrous pedicels; bracts subulate, 2—3 mm long, externally glabrous, adaxially pubescent; bracteoles minute scales, very early caducous, at about the middle of the pedicel. Buds small, globular, open long before anthesis. Receptacle nearly not extended, 1—1.5 mm long, turbinate. Calyx campanulate, margin entire, truncate-undulate, 4 mm long, the top of the sepals appearing on the margin with 5 minute tips. Petals spatulate, gradually tapering into the base, short-clawed, glabrous externally but sparsely or silky hirsute internally along the midrib, about 7—8 mm long, the posterior somewhat longer. Stamens 3 fertile; filaments 7 mm long, thick, glabrous, recurving; anthers 1.5 mm long, splitting lengthwise; reduced stamens 2, 4 mm long; staminodes 2—3, minute, subulate. Ovary densely woolly tomentose, swollen; style very short, at the top glabrous; stigma oblique, flat not large. Pods flat, at first densely velvety, about 4-seeded, with firm, woody valves about 11 cm long, 3—6 cm wide; seeds flat, orbicular, glossy black, 1.5 cm across, albuminous; funicular branches flat, extremely short.

TYPE.—Kunstler 5194 (lectotype: K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Perak (Tampin, Ipoh, Chanderiang), Kelantan (Gua Ninik), Pahang (Gunung Senyum), Selangor (Batu caves on top of the hill), Negri Sembilan (S base of Tampin Hill).

ECOLOGY.—Flower light red, in first half, fruit in second half of the year. On limestone hills, low and medium altitudes. — The midrib of the leaf is the thickest and has strong lateral branches.

LOCAL NAME.—Akar kunjit.

Prain placed this species in *Bauhinia* sect. *Lasiobema*.

5. *Lasiobema tubicalyx* (Craib) de Wit, *comb. nov.*—Fig. 9

Bauhinia tubicalyx Craib in Kew Bull. 1928: 64.

A climber; tendrils numerous, at the top puberulous; young shoots puberulous. Leaves elliptic to ovate or oblong, entire, firmly chartaceous, 3—sub-5-nerved (the outer pair very slender, the lateral nerves raised on the upper surface), 6—9 cm long, 3—4 cm wide, both surfaces glossy, glabrous; petiole slender, glabrous, up to 2.5 cm long; stipules ovate, bluntish, small, about 1 mm long, puberulous. Flowers small, in straight, many-flowered, grey-silky, pubescent, 5—7 cm long racemes, on spreading, slender, capillary, 16—20 mm long, pubescent pedicels; bracts subulate, 3 mm long, grey-pubescent; bracteoles minute, delicately capillary, in the upper part of the pedicel. Buds globular, grey-pubescent. Calyx cup-shaped, truncate, 2 mm long, pubescent; margin with 5 minute tips. Petals spatulate, gradually tapering towards the base, short-clawed, glabrous externally but mostly adaxially sparsely silky hairy, about 7 mm long. Stamens about 8 mm long; filaments glabrous; anthers 1.5 mm long, broadly elliptic; staminodes 7, very short, subulate. Ovary swollen, densely white silky; style very short, glabrous; stigma oblique, small, capitate.

TYPE.—Kerr 12407 (holotype; K).

DISTRIBUTION.—Malaysia: Siam: Surat (Sawang Pi Nawng).

ECOLOGY.—A woody climber on limestone hills in evergreen forest at 100 m altitude; flowering in March.



FIG. 9. *Lasiobema tubicalyx* (Craib) de Wit: top of branch, $\frac{3}{8}$ \times ; flower, slightly enlarged.

The calyx shows five triangular, darker fields, which indicate the sepals. These are connected by lighter coloured tissue and so the cup-shaped cavity of the calyx is formed on top of the receptacle.

6. *LASIOBEMA* sp. nov. A.

In the Singapore Herbarium are preserved Ridley 15109 (Tebing Tinggi, Perlis, Malay Peninsula) and Corner s.n. (Nov. 17, 1941; Tasek

Dayang Bunting, Langkawi, Malay Peninsula), which, most probably, belong to an undescribed, or in Malaysia previously not recorded species.

Ridley's specimen is in fruit; pods narrowly oblong, rounded at both ends, about 7 cm long and 12 mm wide, septate, glabrous, about 6-seeded; seeds about 1 cm across, more or less rhomboid, on a very short broad funicle, its branches very short; leaves glossy, glabrous, coriaceous, more than half split, nearly as broad as long, 10—18 cm across, cordate, lobes long acuminate, with blunt acumen, 9-nerved.

In Corner's specimen (sterile branchlets) the leaves consist of two free leaflets. Petioles long.

This new species may better be named when adequate flowering material becomes available; all characters known indicate that it should be placed into *Lasiobema*.

Lysiphyllum (Benth.) de Wit, *gen. & stat. nov.*

Bauhinia sect. *Lysiphyllum* Benth. in B. & H., Gen. Pl. 1: 576. 1865. — *Bauhinia* Benth. in Fl. austr. 2: 295. 1864; Baker in Hook. f., Fl. Br. Ind. 2: 277. 1878, pro parte.

Shrubs, stragglers or climbers, tendrilled (tendrils paired, one more slender and caducous). Leaves consisting of two free leaflets. Intrastipular trichomes minute, few, not increased. Stipules scaly, minute, early caducous. Flowers medium-sized, in corymbose racemes. Buds ovoid.

Receptacle tubular, rather wide, not dilated at the base. Bracteoles much below or near the middle of the pedicel. Sepals free (or occasionally partly coherent). Perfect stamens 10, all or nearly all fertile. Filaments free. Anthers oblong, opening lengthwise. Ovarial stipe connate with the wall of the receptacle. Ovary glabrous. Style well-developed. Stigma large, peltate. Pods curved-oblong, corky-valved, indehiscent. Seeds (in Malaysia) albuminous, funicular branches short.

TYPE SPECIES.—*Lysiphyllum cunninghamii* (Benth.) de Wit.

DISTRIBUTION.—Insular Australasia and south-eastern Asia.

A small genus typified by *Phanera cunninghamii* Benth. (in Pl. Jungh. 264, 1852) which is better named *Lysiphyllum cunninghamii* (Benth.) de Wit, *comb. nov.* It is represented by one species in Malaysia, a few on the Asiatic continent, and two or three in Australia. *Lysiphyllum diphyllum* (Ham.) de Wit, *comb. nov.* (basinym: *Bauhinia diphylla* Ham. in Symes, Emb. Ava 476 *ic.* 1800), an Indian species, has been recorded for the Malay Peninsula (Baker, *op. cit.* p. 278), but this is probably an error [cf. Prain in J. As. Soc. Bengal 66 (2): 178. 1897].

The genus shows many characters to be considered primitive in Bauhinieae.

KEY TO THE MALAYSIAN SPECIES OF LYSIPHYLLUM

1. Receptacle less than 1 cm long. Petals outside woolly pubescent. *L. binatum*
 1. Receptacle 6 cm long. Petals almost glabrous *L. winitii*

1. *Lysiphyllum binatum* (Blanco) de Wit, *comb. nov.*—Fig. 10

Bauhinia binata („*binata*“) Blanco, Fl. Filip. 331. 1837; Ed. 2, 231. 1845; Ed. 3, 2: 66. 1878; Merr. in Philipp. J. Sci. (Bot.) 5: 43. 1910; Sp. Blancoanae 172. 1918; Enum. Philipp. fl. Pl. 2: 258. 1923; Backer, Bekn. Fl. Java, Nooduitg., 5 (Fam. 118): 18. 1941; Meijer Drees in Comm. For. Res. Inst., Bogor No. 33: 68. 1951. — *Bauhinia pinnata* Walp. in Linnaea 16 (Lit.): 53. 1842. — *Bauhinia diphylla* Zoll. in Nat. geneesk. Arch. Neerl. Ind. 3: 70. 1846 (non Ham. apud Symes) — *Phanera blancoi* Benth. in Pl. Jungh. 264. 1852; Miq., Fl. Ind. bat. 1 (1): 70. 1855. — *Phanera complicata* Miq., Fl. Ind. bat. 1 (1): 70. 1855. — *Bauhinia hookeri* var. *puberula* Benth., Fl. austr. 2: 296. 1864; F. Muell. in Trans. phil. Soc. Victoria 3: 51. 1869. — *Bauhinia Blancoi* (Benth.) Baker in Hook. f., Fl. Br. Ind. 2: 278. 1878; Gagnep. in Fl. gén. Indo-China 2: 144. 1913; Perkins, Fragn. Fl. Philipp. 1: 8. 1904; Backer, Schoolfl. Java 413. 1911.

Shrub, erect to more or less climbing, 3—5 m tall; branches whitish, glabrous except the very youngest parts; tendrils circinate, partly caducous, partly lignifying. Leaves consisting of two free, transversely ovate, asymmetrical leaflets broadly rounded on all sides and base very broadly cuneate, chartaceous; leaflets 2.5—4.5 cm long, 2.5—3.5 cm wide, with 4—5 slender nerves which are slightly prominent on the upper surface and branch repeatedly into slender, ascendent side-nerves, lower surface glabrous or sometimes puberulous near the base, inserted by a thick, distinct joint; petiole slender, 1—2.5 cm long, produced in a blunt, stout, puberulous, caducous tip; stipules very small, scaly, early caducous, more or less blunt-ovate. Flowers in terminal or lateral, simple corymbs up to 6 cm long, on about 10 mm long pedicels; bracts squamaeform and bract-eoles subulate, both ciliate. Buds ovoid-pointed, delicately pubescent. Receptacle tubular, 5—8 mm long, striate. Sepals 4—5, oblong, acute, subequal, less densely pubescent inside, and about equalling the receptacle. Petals very shortly clawed, about 2 cm long and 0.8 cm wide, recurved, externally woolly pubescent, inside thinly pubescent. Stamens 10 perfect, the longer exceeding 2 cm; anthers 4 mm long, opening by a length-slit, connective puberulous. Stipe and recurved style glabrous; stigma peltate. Pod strap-shaped, flat and often curved, indehiscent, up to 20 cm long, about 3 cm wide, the walls corky; seeds 6—13, flat or, when ripe, oddly shaped, irregularly bulging and incised; albumen copious, cartilaginous, appressed to the testa and as large as the cotyledons; funicular fork very short.

TYPE.—Merrill, Sp. Blancoanae 998 (neotype; L.).

DISTRIBUTION.—Siam; Indo-China; Australia. Malaysia: Philippines: Luzon (Tayabas, Zambales, Pangasinan), Coron, Palawan, Dumaran, Cebu,

Panay, Negros, Bohol, Mindanao, Basilan, Sibutu, Sulu Arch. (Tawi-Tawi), British North Borneo (Kampong Bahru), Java (Bay of Batavia, Banjumas, Besuki, Panarukan, Petjaron, Païton), Karimundjawa Is., Kangean Is., Bali, Sumba, Salajar, Celebes, Manipa Is., Morotai, Ceram, New Guinea (Port Moresby, Kappa Kappa, Morobe Distr., Sio beach).

ECOLOGY.—Confined to the proximity of the sea, favouring small islands and there often frequent. In Java rare, on coral beach. Also on sands, among rocks or (on Bali) in tidal forests. Its flowers are white and appear throughout the year. Both stipe and style increase several centimeters in length directly after anthesis if no pollination takes place. Ripe pods in April. — On Timor, Meijer Drees (*l.c.*) found it "along the NE coast only, on coral beach and sandy soils and in the adjacent extremely dry monsoon forest." He further stated that it was evergreen, and fire-resistant, and recommended it for "reafforestations in extremely dry and very dry region for soil protecting purposes." — Becking observed on Bali that the stamens and style are red which more or less confirms Camellus's phrase "ex rubeo lutescentes" regarding the Philippine specimens. The pods are apparently well suited for

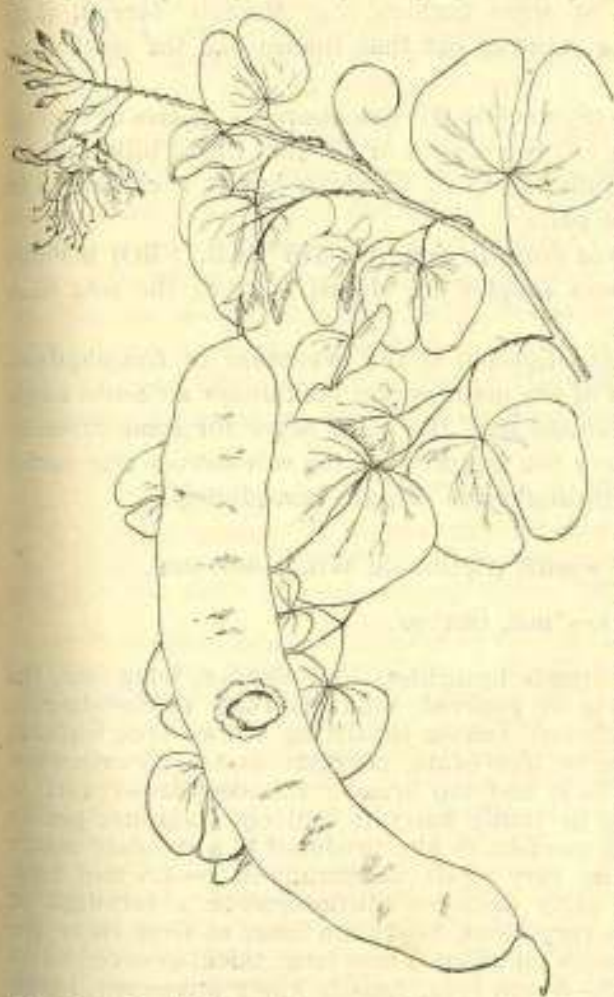


FIG. 10. *Lysiphyllum binatum* (Blanco) de Wit: leaves, inflorescence, and pod, $\frac{3}{4}$ \times .

floating, having corky valves which contain numerous small air cavities. — Van der Pijl (MS.) noted that the bristle (produced midrib) in early stages of the leaf is flat, concave and more or less hooded, and that it covers part of the leaflets.

LOCAL NAMES.—Philippines: alibihil (Bisaya), alibangbang (Tagalog), malabanot (Tagalog), British North Borneo: briong (Banggi).

USES.—Father Kamel (*in Philos. Trans.* 24: 1711, 1704) noted that it was used against blood spitting, bleeding in general, and dysentery.

Walpers copied Blanco's epithet erroneously when writing "pinnata" in which he was followed by some authors (e.g. Miquel). Merrill (*l.c.*, 1918) corrected the mistake pointing out that Blanco had the epithet as "binnata."

Lysiphyllum diphyllum (Symes) de Wit (see above), a species of Birma, Cambodia, and South India (*cf. Gagnepain in Fl. gén. Indo-Chine* 2: 144, 1913), shows a striking similarity to *L. binatum*, but is a climber and very much larger in all its parts.

The holotype of *Bauhinia diphylla* Zoll. (no. 675 "H.B."; BO) belongs here; the same specimen was adopted by Miquel (*l.c.*) as the sole base for his *Phanera complicata*.

A point for further investigation is the nervature in *Lysiphyllum*. In *L. binatum* the branches of the main nerves fork under an acute angle and run appressed to or connate with the main nerve for some distance before deviating. In *Bauhinia* the majority of the side-nerves rise under a straight or nearly straight angle and deviate immediately.

2. *Lysiphyllum winitii* (Craib) de Wit, *comb. nov.*

Bauhinia winitii Craib *in Kew Bull.* 1924: 95.

Tall, woody climber, ultimate branchlets very slender, whip-like, the fertile branches stout, terete or grooved, soon glabrous, reddish-brown, tendrils slender, largely glabrous. Leaves consisting of two free leaflets; leaflets asymmetrical, more or less ovate, chartaceous to subcoriaceous, 4-nerved, 2.5—4 cm long; base and top broadly rounded, lower surface towards the base appressed by thinly hairy to entirely glabrous; petiole about 1 cm long, partly appressed-hairy and produced to a subulate mucro between the leaflets; stipules very small, membranous, 1—1.5 mm long, linear, with rough hairs, early caducous. Inflorescence a terminal or lateral simple corymb, axis very stout, 6—15 cm long, at first rusty pubescent, soon glabrous; flowers on about 5 mm long, thick, grooved, silky pubescent pedicels; bracts 3—5 mm long, densely rusty pubescent, inside glabrous; bracteoles slightly shorter, similar, like the bracts early caducous. Buds ovoid-oblong, velvety pubescent. Receptacle tubular, about 6 cm long, striate. Sepals 5, oblong, acute subequal, 2—3.5 cm long, glabrous inside, at first somewhat coherent, later entirely apart and gradually splitting to the mouth of the receptacle. Petals gradually narrowing towards the base, obovate, rounded, 4—8 cm long, 2—4 cm wide, on the back nearly glabrous. Stamens 10 perfect, nearly as long as the petals; anthers 15—18 mm long; connective broad, glabrous. Ovary, stipe, and style glabrous, slender, slightly longer than the stamens; stipe long and slender.

stigma peltate, about 4 mm long. Pods (*teste* Craib) up to 30 cm long, 8 cm wide, slender, on a 6 cm long stalk.

TYPE.—Winit 494 (holotype; K).

DISTRIBUTION.—Siam (Kanburi). In Malaysia cultivated.

ECOLOGY.—At low altitudes, in open, dry, deciduous forest.

LOCAL NAME.—Kew Nang (Siamese).

USE.—According to Winit the bark is very astringent and is used by the natives for chewing with betel leaves.

Lysiphyllum winitii, of Kanburi (Siam), is a somewhat aberrant species. The floral characters are strongly suggestive of *Gigasiphon*; the very short, thick pedicel, the 6 cm long, tubular receptacle, and the glanduliferous tips of the sepals, in the bud, form to some extent the paw-shaped top characteristic of that genus. On the other hand, *L. winitii* has tendrils, the leaflets are entirely free; the sepals finally split down to the receptacle; the stigma is peltate. *Lysiphyllum winitii* is intermediate between *Lysiphyllum* and *Gigasiphon* and clearly the link between them, though best placed in *Lysiphyllum*. It is an extra-Malaysian species.

PHANERA Lour.

Phanera Loureiro, Fl. cochinch. 37. 1790; *ibid.*, ed. Willd., 47. 1793; Benth. in Fl. Jungh. 263. 1852; Miq., Fl. Ind. bat. 1 (1): 58. 1855; Merr., Comm. Lour. Fl. cochinch. 188. 1935. — *Symphypoda* DC., Mém. XIII Lég. 480. 1825, pro parte.

Tendrilled lianas, stragglers or shrubs; tendrils circinate, very rarely absent. Leaves bilobed, entire or consisting of two free leaflets. Intra-stipular trichomes only represented by minute gland-shaped bodies. Stipules ovate, rounded-auriculate or linear. Flowers medium-sized or small, often showy, in corymbose or elongated racemes.

Buds globose, ovoid, oblong or ellipsoid. Receptacle tubular, rarely ampulliform, often long and narrow, often dilated at the base, usually striate. Some sepals coherent or all free. Perfect stamens 3, rarely 2—4, anterior of the outer whorl, free, opening by a central pore in each theca or splitting lengthwise. Ovarial stipe connate with the anterior wall of the receptacle. Stigma capitate or, as a rule, peltate, large or small. Pods oblong, dehiscent, valves firm; seeds laterally compressed, albuminous, often large, broadbean-shaped. Funicle obliquely conical, large, flat (like an abortive aril), branches long or short. Albumen the size of the cotyledons, flat, on either side of the embryo appressed against the wall of the testa.

TYPE SPECIES.—*Phanera coccinea* Lour. (neotype to be appointed).

DISTRIBUTION.—Tropical Asia, also on the Continent. Throughout Malaysia (centred in Borneo).

The type species, *Phanera coccinea* Lour., is an Indo-Chinese species (see under subgenus *Phanera*). *Phanera* is a heterogeneous genus and

many infrageneric natural taxa are easily recognized. Linked as they are by many intermediate species a large number of them are best arranged as sections and subsections. In particular Borneo is a centre of speciation, but a secondary centre is in the Malay Peninsula.

The earliest descriptive data concerning the genus are found in the "Herbarium amboinense" 5: 1. 1747). Rumphius described the sinuate stems peculiar to many species of Bauhinieae, called attention to the slender, caducous mucro exerted in the top-sinus of the bilobed leaf, which he saw as a prolongation of the midrib, suggested that the bilobed leaf represented two connate individual leaflets, and found the delicate silvery lines on the seed (indicating the course and length of the funicular branches appressed to the young seed in the pod), present in one and absent in another species.

Miquel attempted to subdivide *Phanera* (into sections and species) on account of the characters of the leaves only. Prain, though not recognizing *Phanera* as a genus, rightly stressed that the characters of the bud and receptacle were of first taxonomic importance, a point that had been raised by Bentham first of all (*in* Pl. Jungh. 262. 1852).

The classification proposed here is built on the correlation of characters of the leaf, bud, ovary (stigma), and anthers. When more complete material will become available it may be found necessary to consider the characters of the seed (funicle, albumen) to a larger extent than has been possible at present.

Reasons for regarding subgenus *Phanera* as the first and more primitive taxon in *Phanera* were that the anthers split lengthwise (as in *Bauhinia*, *Gigasiphon*, *Lysiphyllum*, *Piliostigma*, *Lasiobema*, and *Bractecolanthus*) and that the leaf by being deeply bilobed indicates still clearly its bifoliolate origin. In the second subgenus, *Biporina*, which is considered to be more specialized, the anthers open only by a central pore and (a single species excepted) the leaf on adult plants is entire or nearly so, and therefore has further progressed from being bifoliolate. The pollen, which is free in subgenus *Phanera*, is floating in liquid in some (perhaps in all) species of the subgenus *Biporina*, which might be seen as an adaptive or specialized character. Subgenus *Austrocercis* clearly is another specialized taxon; its flowers are suggestive of the papilionaceous flower, but, I think, only superficially so, as the vexillum is interior and the transformation of the larger part of the androecium is carried to an extreme.

Many distributional data are in support of these views, which are purely based on morphology and need to be correlated with anatomical and cytological evidence. Subgenus *Phanera* is by far the widest distrib-

ated, subgenus *Biporina* is restricted to a part of Malaysia, and subgenus *Austrocercis* to a portion of New Guinea. The morphology in *Phanera* is most illustrative of the developmental changes occurring in isolated island populations.

KEY TO THE SUBGENERA OF PHANERA

1. Anthers opening by a length-slit, oblong, generally narrow, 1–2.5 mm long.
2. Buds oblong to ovoid, very rarely more or less globose. Flowers campanulate or spreading. Calyx consisting of free or partly connate sepals, at least 3-lobed. Stamines not reduced to a fleshy body. . . . Subgenus 1. *Phanera* (p. 437)
2. Buds ovoid. Flowers semi-papilionaceous. Calyx 2-lobed. At the base of the vexillum a digitate, fleshy body. . . . Subgenus 3. *Austrocercis* (p. 527)
1. Anthers opening by a central pore in each theca, broadly ellipsoid to suborbicular, sometimes broader than long, never narrow, 1–2.5 mm long. Buds globose to broadly ovoid. . . . Subgenus 2. *Biporina* (p. 490)

Subgenus 1. PHANERA

Folia bilobata. Alabastra ellipsoidea vel elongata, plerumque apiculata, raro subovoidea, rarissime circa globosa. Sepala linearia, reflexa, denique libera, raro lobis 2–3 connata. Antherae longitudinaliter dehiscentes, anguste lineares vel elliptici.

Leaves 2-lobed. Buds ellipsoid or elongate, usually apiculate, rarely ovoid, very rarely nearly globose. Sepals linear, strap-shaped, reflexed, finally entirely free, rarely coherent in 2–3 lobes. Anthers splitting lengthwise, narrowly linear to elliptic.

TYPE SPECIES.—*Phanera coccinea* Lour.

DISTRIBUTION.—South-eastern Asia.

The present Code demands that infrageneric taxa containing the type species shall bear the generic name unaltered. The type species of *Phanera* is *Ph. coccinea* Lour. (Fl. cochinch. 1: 47. 1793). Its identity is uncertain.

Loureiro described it as a large, climbing shrub with cordate, acute, petiolate, bifid, 9-nerved, on the back shiningly rufous leaves. Branches thick, compressed, with tendrils. Flowers scarlet, beautiful, on long peduncles, in large, terminal, pendent inflorescences. The species occurs in the forests of Indo-China, and its branches reach the tops of large trees.

Merrill, who made a special study to interpret Loureiro's plants (*in* Trans. Am. phil. Soc. II 24: 1-445. 1935) was unable to identify *Ph. coccinea* and it seems to me that there can never be certainty on the basis of Loureiro's data now at hand.

A specimen collected by J. & M. S. Clemens (4254) was distributed in the sets of "Plants of Annam, Indo-China, Mt Bani" under the name "*Bauhinia coccinea* (Lour.) DC." Though I am not convinced that the

identification is correct, I have accepted as representing the species. This implies that *Ph. coccinea* is to be assigned to the subgenus delimited above.

ARTIFICIAL KEY TO THE SECTIONS AND SUBSECTIONS OF SUBGENUS PHANERA

1. Receptacle 5—10 cm long. Section 1. *Phanerosiphon* (p. 438)
1. Receptacle up to 3.5 cm long.
 2. Anthers 1—3 mm long. Buds narrowly ovoid, subellipsoid or nearly globular. Sepals coherent in 2—3 lobes, rarely finally free. Petals crenate or crisped. Section 3. *Micranthera* (p. 470)
 3. Ovary stiped. Petals 10—30 mm long.
 4. Receptacle longer than the sepals. Ovary glabrous. Subsection 6. *Corymbosae* (p. 487)
 4. Receptacle shorter than the sepals. Ovary more or less hairy (on the suture).
 5. Receptacle turbinate, 1—3 mm long. Claw of the petals 12—17 mm long, longer than the blade. Subsection 3. *Chloroxanthae* (p. 471)
 5. Receptacle tubular, 4—6 mm long. Claw of the petals up to 5 mm long, shorter than the blade. Subsection 4. *Fulvae* (p. 475)
 3. Ovary sessile. Petals 6—10 mm long, gradually narrower to the base, not or shortly clawed. Receptacle 1—4 mm long. Subsection 5. *Sessiles* (p. 483)
2. Anthers (4—)8—25 mm long. Buds (narrowly) ellipsoid to spindle-shaped. Sepals strap-shaped, sooner or later entirely free, very rarely narrowly ovate and not all free (calyx 4-lobed). Petals usually flat, rarely slightly undulate at the margin. Section 2. *Megathera* (p. 440)
 6. Stigma small, the not increased ending of the style, or capitate. Petals fugacious. Anthers more than 1.5 cm long. Subsection 1. *Insignes* (p. 440)
 6. Stigma large or very large, if comparatively small then peltate. Petals tardily caducous. Anthers 4—22 mm long. Subsection 2. *Clavatae* (p. 445)

Section 1. *Phanerosiphon* Wit, *sect. nov.*

Sectio ex affinitate *Gigasiphonis* et *Bauhiniae*, floribus magnis, receptaculo recto, cylindraco, longo, pedicello brevi crasso, antheris late ellipticis, brevibus, stigmatate peltato distincta.

Section *Phanerosiphon* is a link between *Phanera* and *Gigasiphon* and between *Phanera* and *Bauhinia*. It is characterized by large flowers, a straight, cylindrical, long receptacle, a short, thick pedicel, short, broadly elliptic anthers, large flowers, and a peltate stigma.

TYPE SPECIES.—*Phanera sylvani* de Wit.

DISTRIBUTION.—Malaysia: Borneo.

1. *Phanera sylvani* de Wit, *sp. nov.*—Fig. 11

Species ex affinitate *Bauhinia pottsii* videtur tamen cirrhosa est et calyce haud spathaceo et stimate magno peltato distincta. Affinis quoque ad genus *Gigasiphon* tamen numero staminorum foliis bilobatis longe differt. Folia ovato-rotundata, 15—17-nervia, basi cordata, bilobata. Flores circa 12 cm diametro, flavi, pedicellis crassisque brevissimis sublatis; receptaculum angustum, rectum, cylindraco, circa 10 cm longum; stamina 3 perfecta, staminodium unum; stigma peltatum.

A liana, about 15 m tall; branchlets woolly brown tomentose, strongly angulate or quadrangular, the sides more or less grooved; tendrils in pairs on short, axillary branchlets, appressedly strigose, one on each side of a young shoot. Leaves ovate-rotundate, about $\frac{1}{4}$ bifid, (sub)coriaceous, 15—17-nerved, 12—20 cm in diameter; base very deeply cordate, sinus narrow or closed; top-lobes broadly rounded, sinus rather narrow, midrib excurrent as a slender, about 4 mm long mucro; lower surface sparsely woolly tomentose, densely tomentose on the nerves, connecting nerves (nearly) perpendicular on the main nerves, the tertiary and

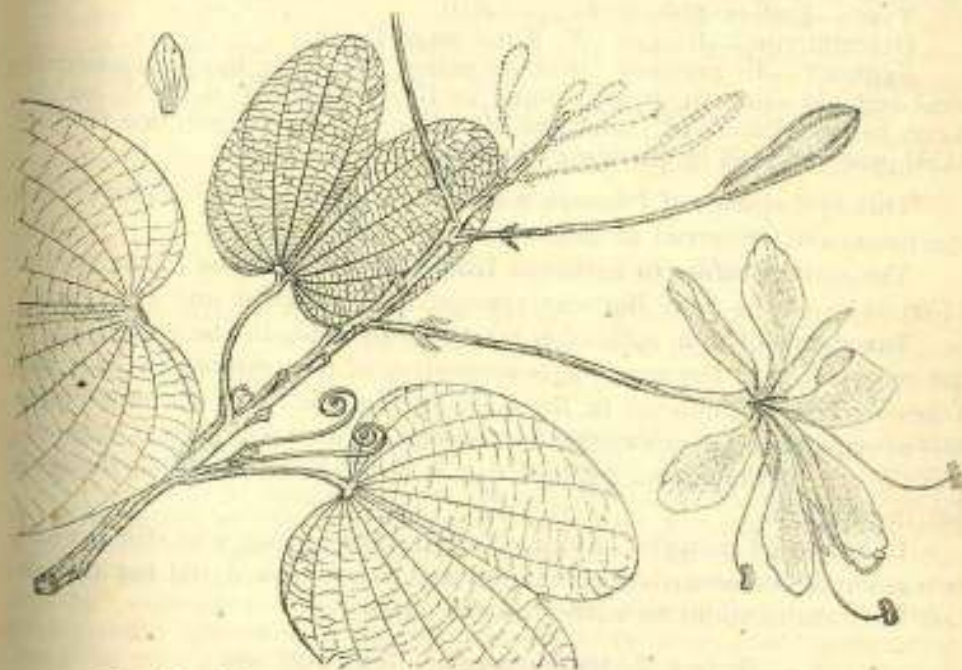


FIG. 11. *Phanera sylvani* de Wit: leaves and inflorescence, $\frac{1}{4} \times$.

quartary nerves forming areoles; petiole stout, brown woolly tomentose, 5—7 cm long; stipules auriculate, foliaceous, orbicular, on the outside densely silky hirsute, inside thinly pubescent, about 1 cm long, about 1.4 cm broad; intrastipular trichomes absent except for minute glandlets on one side. Flowers large, in a short, thick, about 20 cm long, terminal raceme, on very thick, angular, rusty tomentose, about 1.5 cm long pedicels which merge gradually into the about 10 cm long, narrow, cylindrical, straight receptacle; bracts not seen; bracteoles flabby, ovate-acute, about 1 cm long, tardily caducous, tawny tomentose. Sepals coherent in 2—3 partially coherent lobes, narrowly strap-shaped, about 5 cm long, outside brown tomentose, inside coppery, appressedly velutinous (the top possibly inside furnished with a nectary). Petals obovate, yellow, 2—2.5 cm wide, the largest 6 cm long, the upper petals glabrous near the

margin, considerably smaller, like the lower externally silky coppery velutinous, inside centrally also thinly silky, not or scarcely crisped; claw about 1 cm long. Stamens 3 perfect, widely curving, glabrous or very nearly so; filaments 6—7.5 cm long, stout; anthers comparatively small, not quite 1 cm long, about 4 mm wide, splitting longitudinally, brownish grey. Staminode 1, glabrous, about 5 mm long. Ovary recurved, slender, equalling the stamens, silky coppery velutinous; stipe indistinct; style very stout, glabrous just below the stigma; stigma 3—4 mm in diameter, peltate. Pods unknown.

TYPE.—Endert 4060 (holotype; BO).

DISTRIBUTION.—Borneo (W. Kutei near Petah).

ECOLOGY.—In primary forest on rather low river banks, apparently local and not common. It was found in flower on Sept. 6, 1925, and its large, yellow flowers attracted the attention. A second specimen (Endert 3455) was collected in the same district at 450 m altitude.

This new species of *Phanera* was collected twice by Dr. Endert; both specimens are preserved at Bogor and at Leyden.

The epithet refers to Sylvanus Landman (or "Landon") who (before 1702) collected the first Bornean specimen upon record and still extant.

Taxonomically *Ph. sylvani* is most illuminative. In the characters of the receptacle and the sepals it is suggestive of *Gigasiphon*; there is also a pronounced resemblance to *Bauhinia pottsii*. The presence of tendrils, the non-spathaceous calyx, the hairy petals, the three perfect stamens, and the size of the stigma indicate that it is not to be placed in *Bauhinia* but in *Phanera*.

In the dried material, a single fully grown anther was still present. It was curved backwards on both ends and, when soaked, did not straighten. This shape might be normal in the species.

Section 2. *Meganthera* de Wit, *sect. nov.*

Sectio subgeneris *Phanerae* sepalis linearibus, liberis, sive rarissime calyce 4-lobato, alabastris ellipsoideis; petalis planis sive leviter undulatis margine, antheris 8—25 mm longis, rarissime 4 mm longis.

This section of subgenus *Phanera* is distinguished by strap-shaped, sooner or later free sepals (very rarely the calyx is 4-lobed), ellipsoid buds, flat or very slightly wavy petals, and 8—25 mm long anthers (very rarely only 4 mm long). The inflorescence is nearly always an elongate raceme, very rarely corymbose.

TYPE SPECIES.—*Phanera semibifida* (Roxb.) Benth.

Subsection 1. *Insignes* de Wit, *subsect. nov.*

Racemi angusti, elongati, axi-incrassati. Alabastra magna, elongata. Receptaculum latum. Pedicelli crassi, breves. Petala mox caduca, haud vel paullo exsertae calyce. Stamina plus minusve petala aequantes. Antherae circa 2 cm longae. Stigma parvum.

Racemes narrow, elongate, axis thick. Buds large, oblong. Receptacle wide, short. Pedicels thick, short. Petals early caducous, not or little exerted from the calyx. Stamens about equally long as the petals. Anthers about 2 cm long. Stigma small.

TYPE SPECIES.—*Phanera praesignis* (Ridl.) de Wit.

DISTRIBUTION.—Malaysia: Malay Peninsula; Borneo.

KEY TO THE SPECIES OF PHANERA SUBSECTION INSIGNES

1. Leaves 13—15-nerved. Petals externally densely hirsute or pubescent. Stipe distinct, slender.
 2. Top-lobes of leaf rounded. Bracts about 2 cm long. Stipe coppery pubescent (except a glabrous, lanceolate patch). 4. *Ph. praesignis*
 2. Top-lobes of leaf deltoid, acutish. Bracts 2—3 mm long. Stipe glabrous.
 3. *Ph. glabristipes*
1. Leaves 9—11-nerved. Petals externally with a few sparse hairs. Stipe indistinct, very short. 2. *Ph. audax*

2. *Phanera audax* de Wit, *nom. nov.*—Fig. 12

Bauhinia calycina Ridley in J. Roy. As. Soc. Str. Br. 61: 3, 1912 (non Pierre); Fl. Mal. Pen. 1: 626, 1922, quoad nomen et descr. haud synonym., Burkill, Diet. econ. Prod. Mal. Pen. 1: 311, 1935.

A tendrilled climber; young parts red appressedly puberulous. Leaves broadly ovate to suborbicular, 9—11-nerved, $\frac{1}{2}$ – $\frac{1}{2}$ bifid, subcoriaceous, 7—8(—12) cm in diameter; base deeply cordate; top-lobes (narrowly) rounded; upper surface very delicately reticulate, smooth, lower glabrous but sometimes sparsely hairy on the nerves; petiole 3—4.5 cm long; stipules not seen. Flowers in sturdy, elongated, up to 40 cm long, red "mealy" racemes on very stout, up to 3 cm long, puberulous pedicels; bracts ovate-lanceolate, long acute, about 8 mm long, rusty puberulous, dropping very early. Buds bluntly spindle-shaped (including the smooth, campanulate, broad, 0.5—1.5 cm long receptacle), the limb 5-furrowed, appressedly rusty puberulous. Sepals free, about 2.5—3.5 cm long, fleshy, acute, narrow. Petals caducous, at last very little exerted (length scarcely exceeding that of the calyx lobes), narrowly lanceolate, gradually narrowing towards the base, acute, externally with some sparse fugacious hairs. Fertile stamens 3; filaments very thick, angled, glabrous, nearly as long as the calyx lobes; anthers very large, one theca more than 2 cm long, the other about 2.5 cm; staminodes 2, $\frac{1}{2}$ as long as the perfect stamens, stout. Ovary (at first nearly sessile) shortly and thickly stiped; stipe and ovary pubescent; style gradually emerging from the ovary and ending in a knob-shaped, relatively small stigma. Pods smooth, large, 20 cm long, 5—6 cm broad, beaked, 4—7-seeded; valves corky-woody; seeds orbicular, flattened, 2 cm in diameter; funicle broad, triangular, its branches running $\frac{2}{3}$ round the circumference of the seed.

TYPE.—Ridley's collector, *s.n.*, Gunung Pulai, 1892 (holotype; SING).

DISTRIBUTION.—Malaysia: Malay Peninsula: Johore (Sungai Kayu, Gunung Pulai, Kuala Kubu Road), Malacca, Selangor (Kuala Lumpur, Petaling), Negri Sembilan (Bukit Tinggi, Bukit Kupajang, Seramban).

ECOLOGY.—At low altitudes (20—70 m) in forests in the Peninsula. It flowers from October to April.

LOCAL NAMES.—Akar kurutop hitam, tapak kuda, kelapong.

USES.—Boiled roots as a poultice for dropsy (Ridley).

Bauhinia calycina Pierre (in Lec., Not. Syst. 2: 169. Mar. 25, 1912) is quite different from *B. calycina* Ridley and occurs in Cambodia. Pierre's name was published three months before Ridley's and a new name had to be coined to replace the latter. I selected the epithet "audax" on account of the rugged, unyielding appearance of the erect inflorescences.

3. *Phanera glabristipes* de Wit,

sp. nov.—Fig. 13

Species subsectionis *Insignes*, distincta stipite gracili glabra tamen inflorescentia, ramuli, et folia omnia indumento purpureo-fusco tecta. Folia bilobata, 13—15-nervia, magna, cordata. Axis inflorescentiae crassus, teres.

A climber; young parts probably purple-fuscous tomentose; tendrils not seen; branches terete, glossy, at first with a sooty indumentum. Leaves ovate-rotundate, not quite $\frac{1}{2}$ bifid, subcordate, 13—15-nerved (nerves frequently and strongly branching except the decidedly slender midrib);

13—15 cm across; base very deeply cordate, sinus rather wide; top-lobes deltoid, acutish; upper surface dark green, glabrescent, the nerves pallidly puberulent, lower surface purple-fuscous tomentose, later glabrous except on the nerves; petiole 4—6 cm long, sturdy, tomentose, later on glabrescent; stipules not seen. Flowers in very thick, warty, dark purple-fuscous narrow, 20—30 cm long, elongate racemes on short, 7—10 mm long, very

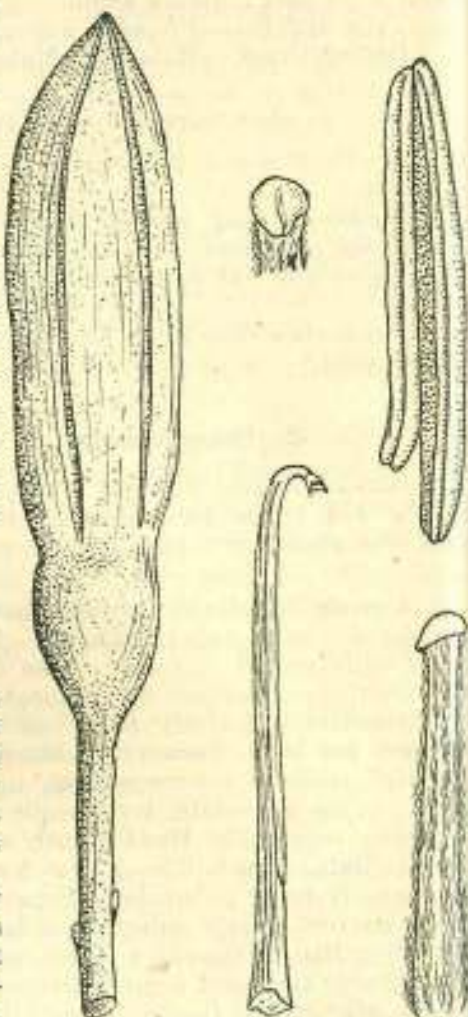
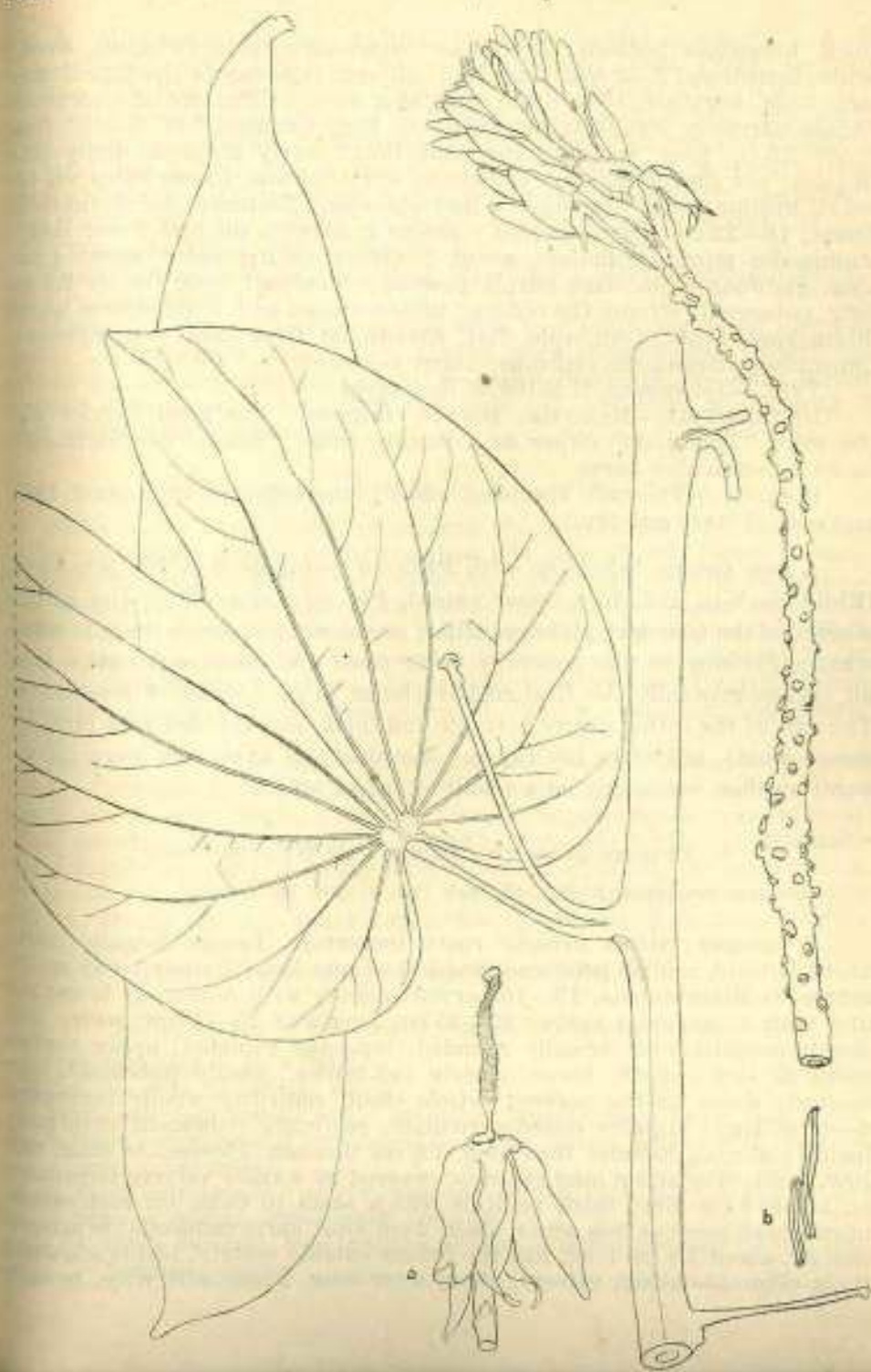


FIG. 12. *Phanera audax* de Wit: bud, stigma, anther, filament, ovary, 2 \times .



thick, tomentose pedicels; bracts and bracteoles early caducous, ovate, acute, tomentose, 2—3 mm long. Buds oblong, tapering to the top. Receptacle wide, angulate, 15—18 mm long, shorter than the sepals, tomentose. Sepals narrowly strap-shaped, reflexed, long coherent but finally free, about 2.5 cm long, velvety tomentose. Petals early caducous (only seen in bud), not clawed, oblong, externally silky-fulvous, inside hairy on the basal, median zone. Stamens in bud glabrous; filaments thick; anthers linear, 18—22 cm long; reduced stamens 2, hirsute (in bud 7 mm long); staminodes minute, subulate, about 2. Ovary on a slender, about 4 mm long, glabrous stipe, dark-purple fuscous-tomentose; style finally 2.5 cm long, pubescent; stigma the oblique, little-widened end. Pods oblong, about 30 cm long, about 6 cm wide, flat, smooth, at first dark purple-fuscous tomentose, afterwards glabrous, about 6-seeded.

TYPE.—Teijsmann H.B.10978 (holotype).

DISTRIBUTION.—Malaysia: Borneo (Kapuas). The label carries also the word "Tampilak," either as a locality (near "Sungai Singkadjang") or as a vernacular name.

ECOLOGY.—The only specimen known was collected in August 1874, and bore flowers and fruit.

A new species belonging with *Phanera audox* de Wit, *Ph. praesignis* (Ridl.) de Wit, and, to a lesser extent, *Ph. sylvani* de Wit. The epithet alludes to the (slender) glabrous stipe; the absence of hairs there is somewhat surprising in this generally hairy plant and because the stipe is of all organs generally the first to have hairs in all species of Bauhinieae. The axis of the inflorescence is terete and thick, and studded with circular, raised warts, left after the flowers are shed; all axes seen were (at the base) swollen, seemingly as a result of insect attack.

4. *Phanera praesignis* (Ridley) de Wit, *comb. nov.*

Bauhinia praesignis Ridley, Fl. Mal. Pen. 5: 305. 1925.

A climber; stems densely rusty tomentose. Leaves broadly ovate, about $\frac{1}{2}$ bifid, midrib produced into a 6—7 mm long, densely rusty woolly mucro, (sub)coriaceous, 13—15-nerved (nerves with numerous branches) and with a marginal nerve; 20—25 cm long and 15—20 cm wide; base deeply cordate, lobes broadly rounded; top-lobes rounded; upper surface more or less smooth, lower densely red-brown, woolly pubescent, particularly dense on the nerves; petiole stout, red-rusty woolly pubescent 6—8 cm long; stipules round-auriculate, red-rusty pubescent externally, inside glabrous, broader than long, 1.5 cm through. Flowers in long, narrow, stout, over 30 cm long racemes, covered by a rusty velvety tomentum, on about 3 cm long, thick pedicels which seem to twist on aestivation; bracts oval, more or less acute, about 2 cm long, early caducous; bracteoles similar, about 1.5 cm long, like the bracts outside velvety, inside glabrous. Buds ellipsoid-oblong, velvety, about 4 cm long. Receptacle wide, broadly

cylindrical, bluntly angular, about 2 cm long. Sepals coherent in 4—5 strap-shaped, acute, 3 cm long, more or less fleshy lobes. Petals narrow, more or less lanceolate, 3.5—4 cm long, not or very shortly clawed, externally coppery hirsute, more or less fleshy. Stamens 3 cm long; filaments thick, glabrous; anthers 22—25 mm long, narrow; staminodes 2, thick, top bifid, 12—14 mm long, glabrous. Ovary on a coppery pubescent stipe (with a glabrous, lanceolate zone), entirely coppery pubescent, recurved; style thick, coppery pubescent; stigma the not enlarged, rounded tip.

TYPE.—Burkill 16404 (holotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Negri Sembilan (Tampin), Pahang (Bentong).

ECOLOGY.—The tips of the sepals seem to contain nectaries. Flowers appear in September, fruits two months later. Burkill and Haniff described the Pahang specimen as a "beautiful *Bauhinia*, the dark leaves contrast with the rich red stems and buds . . . Flowers white, with 3 large stamens of a red colour."

Subsection 2. *Clavatae* de Wit, *subsect. nov.*

Folia $\frac{1}{4}$ — $\frac{1}{2}$ fissa, rarissime integra (*Ph. semibifida* var. *excurrens*) vel per plus quam dimidiam partem fissa (*Ph. pauciflora*). Flores in racemis angustis vel latis rarissime corymbosis. Alabastra oblonga vel ellipsoidea. Sepala libera, denique reflexa. Petalorum laminae planae, haud crispae, oblongae vel anguste (ob)ovate, gradatim ad unguem angustatae vel ad basin attenuatae. Stamina petala aequantia sive longiora, antheras 7—20 mm longas, rarissime breviores, oblongo-ellipticas gerentes. Ovarium totum ferrugineo-tomentosum vel dense pubescens. Stigma peltatum, inplerisque magnum.

Leaves $\frac{1}{4}$ — $\frac{1}{2}$ bifid, very rarely entire (*Ph. semibifida* var. *excurrens*) or more than half bifid (*Ph. pauciflora*). Flowers in narrow or broad, not corymbose, racemes. Buds oblong or ellipsoid. Sepals free, finally reflexed. Petals smooth, not crisped; blade oblong to narrowly (ob)ovate, gradually narrowing into a claw or to the base. Stamens equalling, or longer than, the petals, bearing 7—20 mm long, very rarely shorter, oblong-elliptic anthers. Ovary entirely rusty tomentose or densely pubescent. Stigma peltate, as a rule large.

TYPE SPECIES.—*Phanera semibifida* (Roxb.) Benth.

ARTIFICIAL KEY TO THE TAXA IN PHANERA SUBSECTION CLAVATAE

1. Leaves more than $\frac{1}{2}$ to $\frac{3}{4}$ bifid. 15. *Ph. pauciflora*
1. Leaves less than $\frac{1}{2}$ bifid to entire.
 2. Petals externally densely (silky) tomentose. Stamens up to 4.5 cm long.
 3. Calyx consisting of 4 ovate lobes. Style long, slender. Stigma small. Inflorescence subcorymbose. 10. *Ph. hendersonii*
 3. Calyx consisting of 5 narrow, strap-shaped lobes. Style short or long. Stigma large or medium. Inflorescence racemose.
 4. Petals recurved, their margins revolute. Anthers less than 10 mm long. Receptacle narrow.

5. Stamens up to about 2 cm long. . . . 16a. *Ph. riedelii* var. *riedelii*
5. Stamens 5—6.5 cm long.
6. Stipules ovate-falcate, less than 0.5 cm long, early caducous. Receptacle about 1 cm long. Sepals about 15 mm long. Reduced stamens and staminodes 4—7. 8. *Ph. ferruginea*
6. Stipules orbicular, foliaceous, 1 cm long or longer, subsistent. Receptacle 1.5—2 cm long. Sepals 15—20 mm long. Reduced stamens or staminodes 2.
7. Leaves shiny, glabrous or nearly so on the lower surface, except for the nerves. Stipules 1.5—2.5 cm long. Bracts 7—12 mm long, nearly glabrous. Flowers whitish or yellow, petals 3.5—4.5 cm long. 9. *Ph. griffithiana*
7. Leaves dull, woolly rusty pubescent on the lower surface. Stipules about 1 cm long. Bracts about 6 mm long, pubescent. Flowers red or pink, petals 2.5—3 cm long. 11. *Ph. bullettii*
4. Petals flat, spreading, margins smooth or slightly wavy. Anthers 5—25 mm long.
8. Anthers 15—25 mm long. Buds with 5 strongly raised pairs of longitudinal ribs. Stigma very large, obliquely peltate. Receptacle 10—16 mm long.
9. Stamens 2.5—3 cm long. Leaves 11—13-nerved. Receptacle about 15 mm long. 7b. *Ph. excelsa* var. *aurora*
9. Stamens 4.5—5 cm long. Leaves 9—11-nerved. Receptacle 12—16 mm long.
10. Leaves 9—11-nerved. Sepals about 2.5 cm long; petals 3—3.5 cm long, yellow or white, discolouring yellow. Stamens about 4.5 cm long. Pedicels 2.5—4 cm long. 7a. *Ph. excelsa* var. *excelsa*
10. Leaves 11-nerved. Sepals 3—4 cm long; petals 4.5—5.5 cm long, yellow, discolouring red. Stamens 5 cm long. Pedicels about 5 cm long. 7c. *Ph. excelsa* var. *megalantha*
8. Anthers 5—10 mm long. Buds with or without raised pairs of ribs. Stigma large or medium, not oblique. Receptacle 5—35 mm long.
11. Flowers nearly sessile or on a thick, short (up to 6 mm long) pedicel. Tomentum dark brown.
12. Pedicels absent or nearly so. Stipules 6—8 mm long, orbicular. Receptacle 5—6 mm long. Stigma the slightly increased end of the thick style. 6a. *Ph. dasycarpa* var. *dasycarpa*
12. Pedicels 5—6 mm long. Stipules about 3 mm long, falcate. Receptacle about 10 mm long. Stigma peltate, large. 6b. *Ph. dasycarpa* var. *ridleyi*
11. Flowers on a 1.5—5.5 cm long pedicel. Tomentum dark brown or ferruginous, or nearly absent.
13. Leaves firmly coriaceous, more or less bullate, soon glabrous. Pedicels stout. Inflorescence long, dark brown, woolly tomentose, rather open; axis zig-zag. 14. *Ph. pachyphylla*
13. Leaves chartaceous to subcoriaceous, flat, on the lower surface velutinous, puberulous or glabrous. Inflorescence velutinous or puberulous; axis not zig-zag.

14. Petioles stout, densely woolly, brown tomentose as is the lower surface of the leaf. Pedicels thick, brown tomentose. Stipe of ovary pubescent. Reduced stamens 2.
15. Stamens 4—5 cm long. Leaves 15—17-nerved.
16b. *Ph. riedelii* var. *fabrilis*
15. Stamens 1.5—2 cm long. Leaves 11—13-nerved.
16a. *Ph. riedelii* var. *riedelii*
14. Petioles slender or stout, puberulous to tomentose. Lower surface of the leaves puberulous, glabrescent to tomentose. Pedicels usually slender. Stipe of ovary glabrous or not. Reduced stamens 5.
15. Receptacle 10—15 mm long, shorter or about equally long as the sepals. Inflorescence narrow, 10—20 cm long.
Sepals 15—20 mm long. 5. *Ph. aherniana*
16. Receptacle 20—35 mm long, decidedly longer than the sepals. Inflorescence broad, a few centimeters long.
Sepals 12—15 mm long. 12. *Ph. lingua*
2. Petals externally sparsely delicately pilose, the outer entirely so and the four inner (or all) in the median zone only, sometimes all nearly glabrous. Stamens up to 3 cm long.
17. Receptacle much longer than the sepals, 20—35 mm long. . . 12. *Ph. lingua*
17. Receptacle shorter or about as long as the sepals.
18. Style distinct, comparatively slender, as a rule wholly or partly glabrous. Stigma peltate.
19. Receptacle much shorter than the sepals. Style wholly glabrous, about 2 cm long. Stigma capitate-truncate, small. 18. *Ph. stipularis*
19. Receptacle about equalling the sepals. Style partly glabrous, only at the top. Stigma peltate, rather large. 5. *Ph. aherniana*
18. Style entirely densely pubescent, thick. Stigma very large, the broadened, oblique ending of the style.
20. Leaves entire or the very tip notched, often acuminate.
17b. *Ph. semibifida* var. *excurrens*
20. Leaves bilobed.
21. Buds and pedicels glabrous. Leaves glabrous or on the lower surface minutely puberulous. 17d. *Ph. semibifida* var. *subglabra*
21. Buds and pedicels puberulous to tomentose. Leaves on the lower surface pubescent, sometimes glabrescent.
22. Leaves small, 3.5—4.5 cm across, 7—9-nerved. Racemes slender-topped. 13. *Ph. merrilliana*
22. Leaves 4—16 cm across, (9—)11—15-nerved. Racemes broad-topped.
23. Leaves 13—15-nerved, the lower surface brown-woolly pubescent, 11—16 cm across.
17c. *Ph. semibifida* var. *stenostachya*
23. Leaves (9—)11—13-nerved, the lower surface appressedly puberulous to pubescent, 4—12 cm across.
17a. *Ph. semibifida* var. *semibifida*

5. *Phanera aherniana* (Perk.) de Wit, *comb. nov.*

Bauhinia aherniana Perkins, *Fragm. Pl. Philipp.* 1: 8. 1904; Merr. in *Philipp. J. Sci. (Bot.)* 5: 45. 1910; *Enum. Philipp. fl. Pl.* 2: 258. 1923. — *Bauhinia hallieriana* Elmer, *Leafl. Philipp. Bot.* 2: 691. 1910. — *Bauhinia chalcobapta* Quis. & Merr. in *Philipp. J. Sci. (Bot.)* 37: 151. 1928.

A climbing or straggling shrub; young parts densely rusty pubescent, soon glabrous. Leaves ovate to suborbicular, $\frac{1}{2}$ to nearly $\frac{1}{2}$ bifid, chartaceous to subcoriaceous, 11—13(—15)-nerved (nerves prominent on the lower surface), 5.5—7.5(—12) cm long, 4—6(—8) cm wide; base (slightly) cordate; top-lobes narrowly rounded to obtuse; upper surface glabrous, shining, lower very short appressedly pubescent to glabrescent; petioles slender, pubescent or glabrescent, 1.5—2.5 cm long; stipules broad, more or less orbicular or obovate, with rounded top, 3—5 mm long, on both surfaces puberulous. Flowers densely placed, up to 14 in each, 10—20 cm long, densely pubescent, 4—7.5 cm long raceme, on 1.5—3.5 cm long, pubescent pedicels; bracts oblong, acute, 7 mm long; bracteoles about 4 mm long, placed at one side of the pedicel and near its base, like the bracts outside pubescent, inside glabrous. Receptacle tubular, rather wide, not or slightly dilated at the base, pubescent, 10—15 mm long, about 3 mm in diameter, finally slightly longer than the sepals. Sepals strap-shaped, acute, pubescent externally, 15—18(—20) mm long, 3.5—4.5 mm wide, finally reflexed. Petals subequal, densely silky coppery tomentose externally, glabrous adaxially, more or less recurving, obovate-lanceolate, obtuse, gradually or suddenly contracted to a claw, 2.5—3.5 cm long, 7—13 mm wide. Stamens 2—3 cm long; filaments glabrous; anthers oblong-elliptic, 7—8(—10) mm long. Ovary, stipe, and style very densely pubescent with appressed, short, cupreous hairs; ovary shorter than the stamens; style slender, about 1 cm long, glabrescent or glabrous at the top; stigma globose or peltate, large.

TYPE.—Merrill 1237 (holotype; A).

DISTRIBUTION.—Malaysia: Philippines: Luzon (Isabela, San Mariano, Bosoboso, Rizal), Mindoro (Baco; Puerta Galera), Leyte.

ECOLOGY.—Along streams and in open forests, at 650 m altitude. Flowers greenish yellow, stamens white. Flowers in January to May. "Flowers sweetly fragrant" (Elmer). "Common in shale or sandstone soil of shrubberies in all grassland gulches; also on the north side of Sibuyan island." (Merrill). Kienholz (280) collected it on Mindoro as a scandent, yellow flowered shrub, at 230 m altitude, in May.

The holotype of *Bauhinia hallieriana* Elmer (*l.c.*; Elmer 12172; FI) is more or less intermediate between *Phanera lingua* (DC.) Miq. and *Ph. semibifida* (Roxb.) Benth. It has the length but not the shape of the receptacle in common with *Ph. semibifida*; the petals are externally evenly silky, though glabrescent. The hairiness of the petals and the partially glabrous, slender style indicate its affinity to *Ph. lingua*. There is also a relationship to *Ph. griffithiana* Benth.

The holotype of *Bauhinia chalcobapta* Quis. & Merr. is Ramos & Edano, B.S.47217 (A).

6. PHANERA DASYCARPA MIQ.

Phanera dasycarpa Miquel, Fl. Ind. bat. 1 (1): 1078. 1858. — *Bauhinia ridleyi* Prain in J. An. Soc. Bengal 66 (2): 185. 1897; Ridley, Fl. Mal. Pen. 1: 268. 1922. — *Bauhinia rahmatii* Merr. in Pap. Michigan Acad. Sci. 19: 158. 1934.

6a. Var. DASYCARPA.

Bauhinia rahmatii Merr. in Pap. Michigan Acad. Sci. 19: 158. 1934.

A climber; tendrils strong; branchlets brown-tomentose. Leaves broadly (ob)ovate, $\frac{1}{5}$ — $\frac{1}{4}$ bifid, coriaceous, 9—11-nerved (transversal nerves prominent, numerous); 8—10 cm across, base deeply cordate; top-lobes rounded; upper surface glossy, lower surface brown-pubescent; petiole sturdy, glabrescent, 1.5 cm long; stipules densely or thinly pubescent on both surfaces, obovate to orbicular, rounded, 6—8 mm across, tardily caducous. Inflorescences dense, contracted, silky coppery velutinous; pedicels thick, densely pubescent, a few millimeters long; bracts more or less orbicular to broadly ovate, more or less acute, coppery hairy. Buds thick, more or less blunt, broadly ellipsoid. Receptacle very broad, short, 5—6 mm long. Sepals velutinous outside, 11—14 mm long, gradually reflexed. Petals ovate to elliptic, suddenly narrowing into the claw, about 18 mm long (including the about 2 mm long claw), externally silky velutinous, inside glabrous. Stamens 17—20 mm long; filaments slender, glabrous; anthers 6 mm long. Ovary on a velutinous stipe, large, velutinous, suddenly contracted to a thick, 7 mm long style; stigma peltate, the slightly widened end of the style. Pods (when young) 9 cm long, 3 cm wide, glabrous (except on the sutures), 1—2-seeded; seeds at least 1.5 cm long; funicle conical, its branches rather stout, encircling $\frac{2}{3}$ of the seed.

TYPE.—Teysmann H.B.894 (holotype; U).

DISTRIBUTION.—Malaysia: Sumatra (East Coast; Damuli, Kualu, Rantauaparapat, Bilah, Marbau).

ECOLOGY.—Flowers in October.

LOCAL NAMES.—Andor si bola.

This variety is close to variety *ridleyi* but differs in the shape and size of the stipules and in that the flowers are nearly sessile; the stigma is smaller.

The holotype was collected by Teysmann at Lubuksikaping in Sumatra; it consists of a stem and some leaves. A pod, which should be tomentose, judging from the epithet given by Miquel (but no hairiness is mentioned in the description) was not found to be present. I have no doubt, however, that the holotype represents what was later described as *Bauhinia rahmatii* Merr. (holotype, Rahmat si Torus 161; A). *Phanera*

pyrrhoclada (Drake del Cast.) de Wit, *comb. nov.* (basinym, *Bauhinia pyrrhoclada* Drake del Cast. [in J. Bot. (ed. Morot), Paris 5: 218, 1891] of Tonkin is closely related to *Ph. dasycarpa* var. *ridleyi* (Prain) de Wit, but differs by its crowded, conical inflorescence, slender glabrous style; small peltate stigma, and hairy stamens.

6b. Var. *ridleyi* (Prain) de Wit, *var. & stat. nov.*

Bauhinia ridleyi Prain in J. As. Soc. Bengal 66 (2): 185, 1897.

A very strong, shrubby climber, over 6 m tall; branchlets and young parts rusty or greyish woolly tomentose, vaguely angulate; tendrils few, slender, glabrescent. Leaves suborbicular-ovate, $\frac{1}{4}$ — $\frac{1}{2}$ bifid, chartaceous to subcoriaceous, 6—10 cm across, 9—11-nerved; base more or less truncate to shallowly cordate; top-lobes broad, acute to acuminate or bluntish; on the upper surface loosely appressedly woolly hirsute, gradually glabrescent, on the lower appressedly rusty pubescent, denser so on the nerves; petiole 2—3 cm long, densely woolly pubescent; stipules ovate-lanceolate, falcate, 3 mm long, externally thinly villose, early caducous. Flowers crowded in dense, conical, short, rusty woolly, gradually lengthening, about 5 cm long, racemes (the axis heavily warted after the flowers are shed); pedicels thick, 6 mm long, densely pubescent; bracts ovate, acute, 7 mm long, rusty pubescent, bracteoles 3 mm long, both tardily caducous. Buds (limb) ellipsoid, rusty pubescent. Receptacle broadly cylindrical, 8—10 mm long, at the base not or scarcely dilated, more or less striate, pubescent. Sepals free, more or less reflexed, strap-shaped, acute, 10—12 mm long. Petals subequal, recurved, oblong-obtuse, short-clawed, 13—20 mm long; about 4—8 mm wide, densely silky tomentose externally. Stamens nearly 2 cm long; filaments glabrous; anthers about 7 mm long; staminodes 2—3, about 1 cm long. Ovary shortly stalked, densely tomentose, 2-ovulate; style thick, tomentose; stigma large, obliquely peltate. Ripe pods unknown, when young pubescent.

TYPE.—Ridley *s.n.*, Penang (lectotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Perak (Salak; Kelidang, Saiong Forest), Kelantan (Kuala Sameh), Kedah (Weng Road; Teniang Road), Penang (Government Hill).

ECOLOGY.—Petals pure white, anthers crimson. Flowers in November to February, at low altitude. Ridley collected a paratype in February, 1892, at Penang (Government Hill).

LOCAL NAME.—Akar dawat.

Phanera dasycarpa var. *ridleyi* is closely allied to *Ph. aherniana* (Perk.) de Wit but differs from that species by its more hairy leaves (which have fewer nerves), thicker and longer petioles, shorter pedicels, receptacle, and sepals, smaller petals, a stouter, more hairy style and possibly also in the colour of the flower.

7. PHANERA EXCELSA Bl. ex Miq.

Phanera excelsa Blume ex Miquel, Fl. Ind. bat. 1 (1): 62-63. 1855. — *Bauhinia excelsa* (Bl.) ex Korth. in Verh. nat. Gesch., Bot. 90 pl. 23. 1841, nom. in syn. sub *B. ferruginea* Roxb. — *Bauhinia excelsa* (Bl. ex Miq.) Prain in J. As. Soc. Bengal 66 (2): 502. 1897. — *Bauhinia ferruginea* Roxb. var. *excelsa* Baker in Hook. f., Fl. Br. Ind. 2: 283. 1878, quoad nom. haud spec. cit. — *Bauhinia megalantha* Merr. in Philipp. J. Sci. (Bot.) 11: 81. 1916. — *Bauhinia ferruginea* Roxb. sensu Korth. in Verh. nat. Gesch., Bot. 90 pl. 23. 1841; Miq., Anal. bot. 1: 11. 1850.

7a. Var. EXCELSA.

A large climber or straggling shrub; tendrils when young woolly hirsute; young shoots woolly brown hirsute. Leaves (ob)ovate to about rounded, $\frac{1}{4}$ — $\frac{1}{2}$ bifid (sinus narrow), chartaceous, 9—11-nerved, 5—8 (—10) cm across; base cordate; top-lobes narrowed to rounded; lower surface thinly (and loosely) rusty pubescent, finally almost glabrous, when young on the nerves spreadingly rusty hirsute; petiole slender, 2—5 cm long, at first spreadingly rusty hirsute; stipules orbicular to oblong, rarely acutish, externally silky, brown hirsute, upper surface thinly puberulous. Flowers in sturdy, terminal or lateral, erect, narrow, rusty puberulous, 10—25 cm long racemes, on stout, stiff, 2.5—4 cm long puberulous pedicels; bracts and bracteoles ovate, obtuse, very early shed. Buds rusty puberulous, upper part oblong-ellipsoid, apiculate, with 5 longitudinal grooves (ridges raised). Receptacle wide, infundibuliform, bent and slightly gibbous at the base, nearly smooth, 1.2—1.6 cm long. Sepals acute, strap-shaped, reflexed, about 2.5 cm long. Petals obovate, broadly elliptic, or oblong, about 3.5 cm long, externally rusty silky tomentose, inside with few sparse hairs, with up to 1 cm long claw, densely pubescent. Stamens about 4.5 cm long; filaments glabrous; anthers oblong-elliptic, 1.5—2 cm long; reduced stamens 2, about 2 cm long. Ovary on a long, puberulous, curved stipe, rusty tomentose, 4—10-ovulate, gradually merging into the thick, tomentose style; stigma very large, oblique, peltate. Pods oblong-elliptic, 20—25-cm long, 4—5 cm wide, only when young red puberulous, about 6-seeded; seeds imbedded in pulp, flattened-orbicular, up to about 2 cm across, exalbuminous; funicle narrowly triangular, suddenly broadening on to the hilum and forking, both branches like a narrow fringe running along the edge of the seed for $\frac{1}{2}$ its circumference.

TYPE.—Korthals *s.n.*, Borneo (holotype; L 908.107-1021/1029).

DISTRIBUTION.—Malaysia: Rhio Arch. (Pulu Tudjuh, Ajer Latang), Borneo (Mts. Pamatton and Sakumbang, Prarawin; British North Borneo: Mt. Kinabalu: Tenompok; Sarawak: Pulau Lemukutan, Matang, Dallas).

ECOLOGY.—In Sarawak collected at 210 m altitude, flowering in August with "handsome yellow flowers"; occurs on Mount Kinabalu at about 1500 m. Bännemeijer noted on Pulu Tudjuh (altitude 50 m) that the flowers were white, discolouring yellow; Ridley (at Matang) noted; "white turning green."

Korthals described one of his Bornean specimens as *Bauhinia ferruginea* Roxb., but noted that a certain difference seemed to exist between his specimens and Indian *B. ferruginea*. In synonymy he noted the name *B. excelsa* but did not refer to Blume as the (MS.) author of that name; "Index kewensis," therefore, was not justified to enter "*B. excelsa* Blume ex Korth."

Baker (l.c.) referred to Korthals's work but distinguished a variety *excelsa* of *B. ferruginea* and cited a specimen collected by Griffith in Malacca. Baker gave *Ph. excelsa* Bl. as a synonym of his variety *excelsa*. This specific name, however, had been published by Miquel [Fl. Ind. bat. 1 (1): 62. 1855] who cited Blume as the (MS.) author of *Ph. excelsa*. Baker based the epithet 'excelsa' on Miquel's publication and Blume's MS. name; these names are typified by the same material 908.107-1021/1029 and 909.72-28). Griffith's Malaccan specimen is the type of *Bauhinia ferruginea* Roxb. var. *excelsa* Baker which belongs in *Ph. semibifida* Roxb.

There is a certain incongruity in the morphology of this plant. The leaves are remarkably small and tender in comparison to the bulky flowers, the tendrils rather weak. I suspect that it is some polyploid relation of *B. ferruginea* Roxb.

7b. Var. *aurora* de Wit, var. nov.

A *Ph. excelsa* var. *excelsa* foliis maioribus, (11—)13-nerviis, receptaculo breviori, petalis staminibusque brevibus, pedicellis crassioribus et floribus roseo-albis, colore aurorae, recedit.

A giant liana. Leaves ovate to orbicular, often broader than long, 11—13-nerved, subcoriaceous, 8—10(—16) cm across, the lower surface appressedly pubescent; petioles stout, 3—6 cm long tardily glabrescent; stipules not seen. Flowers not very numerous, in stout, brown tomentose racemes, on stout, 4—5 cm long, tomentose pedicels. Buds woolly tomentose, with 5 longitudinal grooves (rims strongly raised). Receptacle wide, somewhat dilated at the base, nearly smooth, about 1 cm long. Sepals acute, strap-shaped, about 2.5 cm long, reflexed. Petals ovate, about 3 cm long, externally rusty silky tomentose, inside glabrous except on the about 7 mm long claw. Stamens 2.5—3 cm long; filaments glabrous; anthers oblong-elliptic, 1.5 cm long; reduced stamens 2, about 5 mm long. Ovary and style densely silky tomentose; stipe densely tomentose except for a glabrous patch; stigma very large, oblique, peltate.

TYPE.—Clemens 28112 (holotype; BO).

DISTRIBUTION.—Malaysian: British North Borneo (Mt. Kinabalu, Bundu Tuhan; Tenompok; Kundusan).

ECOLOGY.—The type specimen was collected at about 1800 m altitude, in a jungle; the Clemenses (51709bis) found it also near Kundusan. The flowers are described as "salmon to bright pink, some petals white." Flowering from February to March.

This new variety is distinguished from *Ph. excelsa* var. *excelsa* by its subcoriaceous, 11—13-nerved, broader leaves, thicker and longer white flowers (petals distinctly clawed). Carr, Singap. Field 26945 and Clemens 28776 also belong here; the latter specimen was described as "a tree."

7c. Var. *megalantha* (Merr.) de Wit, var. & stat. nov.

Bauhinia megalantha Merrill in Philipp. J. Sci. (Bot.) 11. 81. 1916.

Leaves roundish; base broadly rounded to shallowly cordate; top lobes broadly rounded, 11-nerved; lower surface thinly appressedly pubescent; midrib excurrent as a slender, pubescent, about 5 mm long mucro. Flowers in few-flowered racemes, on stout, about 5 cm long, rusty pubescent pedicels. Receptacle wide, ribbed, obliquely infundibuliform, bent, about 14 mm long. Sepals 3—3.5 cm long. Petals 4.5—5.5 cm long, 12—18 mm wide, oblong to oblong-(ob)ovate, with acutish top, gradually narrowing into a fleshy, 4—9 mm long claw, externally silky velvety. Filaments 5 cm long, with a few sparse, pubescent hairs; anthers 18—22 mm long. Style (like the ovary silky rusty velvety) thick, 2 cm long; stigma very large, peltate. Pods 5 cm wide.

TYPE.—Hose 163 (holotype; n.v.).

DISTRIBUTION.—Malaysia: Borneo: Sarawak (Baram Distr., Entoyot R.), British North Borneo (Tinambak, K. Penyu; Jesselton; Mt. Kinabalu, Dallas Distr.; Kalawat, Kota Belud; Lahad Datu (Bukit Kretam).

ECOLOGY.—Flowers yellow, turning red; from low altitude to 1000 m.

LOCAL NAMES.—Dadahop (Dusun), dahup-dahup (Kedayan), Kulabid (Malay).

USES.—Native medicine.

Merrill's *Bauhinia megalantha* cannot be maintained as a distinct species, but may be kept as a variety in *Ph. excelsa* occurring in the north-western part of its area of distribution, and differing from variety *excelsa* mainly in its larger flowers and few-flowered inflorescences. Intermediate specimens occur (e.g. Clemens 26278).

8. PHANERA FERRUGINEA (Roxb.) Benth.

Phanera ferruginea (Roxb.) Benth in Pl. Jungh. 262. 1852, quoad nomen; Mig. Fl. Ind. bat. 1 (1): 62. 1854. — *Bauhinia ferruginea* Roxburg, Hort. bengal. 90. 1814, nomen; Fl. ind., ed Carey 2: 331. 1832; ed Clarke, 348. 1874; Baker in Hook. f., Fl. Br. Ind. 2: 283. 1878, quoad specim. excl. var.; Prain in J. As. Soc. Bengal 66 (3): 184. 1897; Gagnep. in Pl. gén. Indo-chine 2: 126. 1913; Ridley, Fl. Mal. Pen. 1: 628. 1922.

A large shrubby climber; branchlets glabrescent; tendrils glabrous. Leaves ovate, split more or less $\frac{1}{2}$ downwards, subcoriaceous, 9—11-nerv-

Sungai Buloh), Johore (Kota Tinggi-Mersing Road; Labis Estate), Kedah (Sungai Duri; Sungai Krian), Malacca (Ayer Panas); Sumatra (East Coast, Bila, Wingfoot Estate).

ECOLOGY.—Occurring up to 150 m altitude; flowering from April to August. Not very common in thickets (Ridley). The petals are green-veined, white, and yellow with age, "pale greenish yellow, with a silvery tinge" (Kunstler); sometimes only the basal part white. Stamens bright pink. The Bingham (No. 1268) collected it in Sumatra on sandy loams, in secondary jungle; the flowers (November) were olive-green. K. G. Pillai noted in Johore: "A small tree of luxurious growth . . . found generally on laterite and hard soils, indicative of a good fertility of the soil."

USES.—A decoction is drunk for diarrhoea (Pahang) or applied for ulceration in the nose (Perak; both records uncertain).

The type of *Bauhinia suffruticosa* Ridley (Ridley 2606; K) proved to belong here.

10. *Phanera hendersonii* de Wit, *sp. nov.*

Ex affinitate *Ph. vahlii*. Differt tamen foliis minoribus, acute lobatis, floribus maioribus, stylo crassiore toto tomentoso (ovario graciliore) et stipite glabro.

A climber; tendrils strong, compressed, like the grooved branchlets greyish-brown, short-tomentose. Leaves ovate-orbicular, $\frac{2}{3}$ bifid, 13-nerved (nerves raised on the upper surface and much raised on the lower surface, strongly branching), 11—15 cm long and nearly as wide; base deeply cordate; top-lobes broadly deltoid, more or less acute; upper surface at first grey-brown tomentose, later glabrous (except the tardily glabrescent nerves), lower surface red-brown tomentose, gradually somewhat glabrescent (the nerves densely tomentose); petiole stout, 4—6 cm long, red-brown tomentose; stipules ovate-acute, tomentose, about 3 mm long, early caducous, intrastipular trichomes numerous, delicate. Flowers in short, grey-brown about 5 cm (finally 15 cm) long, subcorymbose racemes (peduncles finally studded with highly raised warts), on angulate stout, 2.5 cm long, grey-brown tomentose pedicels; bracts oblong-ovate, acute, about 6 mm long; outer surface tomentose, inner thinly pubescent; bracteoles similar, narrower and somewhat shorter, in the upper half of the pedicel subopposite. Buds broadly and short ellipsoid. Receptacle widely tubular, striate, grey-brown tomentose, not dilated at the base, about 13 mm long. Sepals finally nearly free or 2 coherent (calyx 4-lobed), silky tomentose, equalling or just exceeding the receptacle. Petals obovate with broadly rounded top, crenulate margins, about 2.5 cm long, 12—15 mm wide (including the short, indistinct claw), externally silky tomentose, inside glabrous. Stamens up to 3.5 cm long (decreasing in length), the largest with a fugacious, hairy fringe, the others glabrous; anthers 6—8 mm long, broadly elliptic; staminodes about 4, subulate, 4 mm long. Ovary recurved, on a slender, about 3 mm long, glabrous stipe, entirely golden tomentose, gradually narrowing into the long, entirely tomentose style; stigma small, swollen-peltate. Pod red-brown, short tomentose, 26 cm

long, 5 cm wide, flat, firm-valved, about 10-seeded; seeds more or less orbicular, flat, about 12 mm across, notched at the hilum; funicle obliquely conical, branches very short.

TYPE.—M. R. Henderson, Singap. Field. 10515 (holotype; SING).

DISTRIBUTION.—Anambas Is.

ECOLOGY.—Flowering in April. Flowers and pod red pubescent. Flowers white. Henderson noted: "Common here, usually in secondary growth and open places, but rarely in the forest." Altitude about 30 m.

Only the type specimen is known, collected by Mr. M. R. Henderson, formerly Director of the Singapore Botanic Garden; this new species is named after him.

It is closely allied to *Ph. vahlii* Wall. ex Benth., an Indian species, but *Ph. hendersonii* is different in its more or less acutely lobed leaves, larger flowers, thicker, entirely tomentose style (more slender ovary), and glabrous stipe.

Phanera hendersonii is at present placed in section *Meganthera*. There is, however, a distinct relationship to subsection *Corymbosae* (section *Micranthera*) on account of its subcorymbose inflorescence and the shape of bud and petals. Its position is to be reconsidered in connexion with the taxa in *Phanera* centred on the south-eastern part of the Asiatic continent.

11. *Phanera hullettii* (Prain) de Wit, *comb. nov.*

Bauhinia hullettii Prain in J. As. Soc. Bengal 66 (2): 183. 1897.

A strong, shrubby climber; branchlets rusty pubescent; tendrils few, slender, when young appressedly hairy. Leaves broadly ovate to orbicular, often broader than long, $\frac{1}{2}$ bifid, chartaceous, 9—11-nerved, 6—8.5 cm across; base cordate; top-lobes rounded; upper surface dull, at first pubescent, lower surface in young leaves densely appressedly rusty hirsute, at last glabrescent; petiole slender, about 2 cm long, at first rusty pubescent, later glabrescent; stipules about 1 cm long, more or less orbicular, foliaceous, thinly pubescent on both surfaces, tardily caducous. Inflorescences dense, short terminal racemes, (or lateral and leaf-opposed, *teste* Prain); pedicels 2.5—3 cm long, rusty pubescent; bracts lanceolate, about 6 mm long, early caducous; bracteoles small. Buds ellipsoid to obovoid (upper part), rusty puberulous. Receptacle striate, narrow, dilated at the base, glabrescent or pubescent. Sepals strap-shaped, acute, 1.5—2 cm long, slightly exceeding the receptacle, puberulous, reflexed, entirely free on aestivation. Petals recurving, densely tomentose outside, 2.5—3 cm long, margins repanding. Stamens 3 fertile; filaments glabrous, 5—6 cm long; reduced stamens 2, 12—15 mm long. Ovary rusty tomentose, on a long, tomentose stipe; style smoothly curving, entirely hairy; stigma peltate. Pod glabrescent when young.

TYPE.—Curtis 784 (lectotype; SING).

DISTRIBUTION.—Malaysia: Malay Peninsula: Penang (Waterfall), Perak (Tapa), Malacca, Singapore (19th century).

ECOLOGY.—Low altitude; apparently uncommon. — Prain stated that the calyx and pedicels when fresh are rose-red, the petals rose-pink, the filaments uniform pink.

LOCAL NAMES.—Tapa (Perak), tapak kuda antan (Singapore).

Phanera hullettii is closely related to *Ph. griffithiana* Benth. It differs in that the stipules are smaller and thinly pubescent on both surfaces, the leaves more hairy (especially when young) and dull, the pedicels longer, the flowers and bracts smaller, and the colour of the flower is different. When more data become available, it has to be reconsidered whether *Ph. hullettii* might be reduced to subspecific rank.

12. PHANERA LINGUA (DC.) Miq.—Fig. 14

Phanera lingua (DC.) Miquel, Fl. Ind. bat. 1 (1): 67. 1855. — *Bauhinia lingua* De Candolle, Prodr. 2: 516. 1825 (*Folium linguae* Rumph., Herb. amb. 5: 1. 1747); Merr., Int. Rumph. Herb. amb. 256. 1917; Heyne, Nutt. Pl. Ned. Ind., 2de Druk, 736. 1927. — *Bauhinia cordifolia* Roxb., Fl. ind., ed. Carey, 2: 282. 1832. — *Bauhinia teysmanniana* Scheffer in Ann. Jard. bot. Buitenz. 1: 19. 1876; Koord. in Meded. 's Lands PIT. 19: 427, 629. 1898, "*B. teysmannianum*"; Kanehira & Hatusima in Bot. Mag., Tokyo 56: 362. 1942. — *Phanera teysmanniana* (Scheff.) Warb. in Bot. Jb. 13: 332. 1891. — *Bauhinia antipolana* Perkins, Fragm. Fl. Philipp. 1: 9. 1904; Merr. in Philipp. J. Sci. (Bot.) 5: 45. 1910. — *Bauhinia pinchatiana* Perkins, Fragm. Fl. Philipp. 1: 12. 1904; Merr. in Philipp. J. Sci. (Bot.) 5: 45. 1910. — *Bauhinia scandens* L. *sensu* L., Sp. Pl., Ed. 2, 1: 535. 1762. — *Bauhinia semibifida* Roxb. *sensu* Vidal, Sin. Atlas, 24 pl. 437 f. 1. 1883; F.-Vill., Nov. App. 73. 1880.

A tendrilled liana, up to 30 m tall; young parts velvety rusty-tomentose. Leaves broadly ovate or obovate, to $\frac{1}{2}$ bifid (sinus deltoid), subcoriaceous, 11–13-nerved, 8–10 cm in diameter; base cordate; top-lobes acutish to blunt; upper surface shining, sometimes delicately reticulate, lower, brown woolly pubescent to glabrous; petiole 3–5 cm long, pubescent; stipules obovate to orbicular, crisped, 5 mm long, thinly pubescent on both surfaces. Flowers in lateral, brown velvety corymbs, on woolly pubescent, 3–4 (–5.5) cm long pedicels; bracts narrowly ovate, acuminate, 5–8 mm long, pubescent, tardily caducous; bracteoles shorter, ovate, near the base of the pedicels. Buds obovate to ellipsoid, apiculate. Receptacle (narrowly) tubular, 20–35 mm long, as a rule much longer than the sepals, rarely nearly equal, not swollen at the base, striate, woolly rusty pubescent. Sepals linear, free, acute, reflexed, 12–15 mm long. Petals elliptic-obovate, the upper gradually, the lower more abruptly, narrowing into the claw, nearly equal in length, 2.5–3.5 (–4) cm long including the 4–6 mm long claw, (thinly) appressedly silky hirsute externally. Stamens

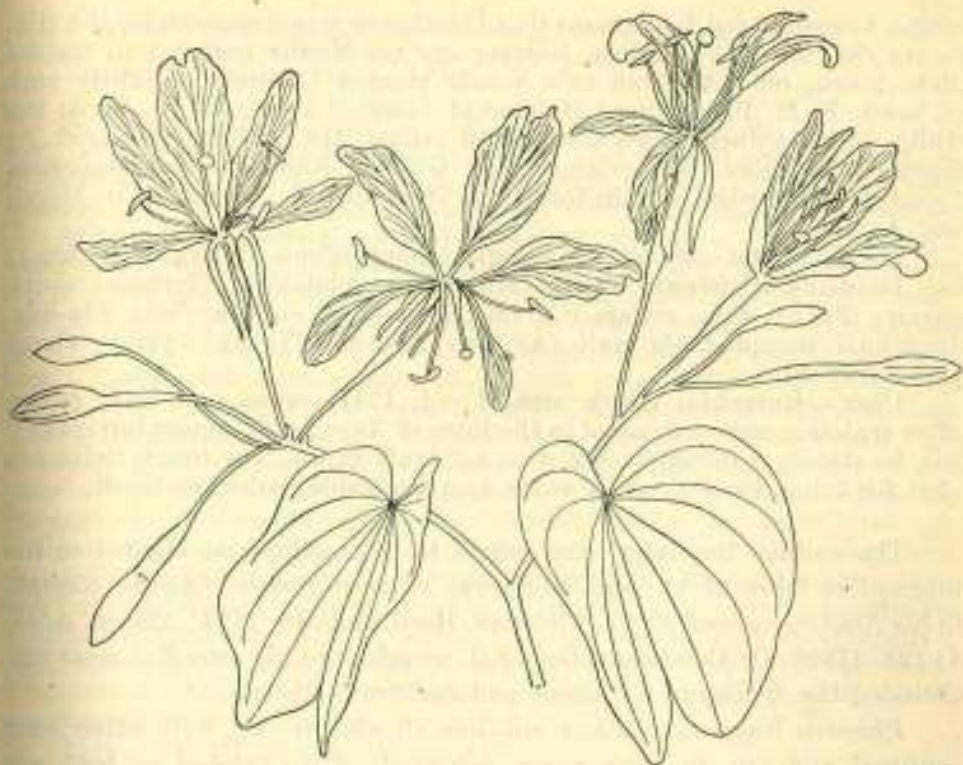


FIG. 14. *Phanera lingua* (DC.) Miq.: inflorescence and leaves, $\frac{1}{2}$ X.

22—28 mm long; filaments glabrous; anthers broadly elliptic, 5—8 mm long; reduced stamens 5. Ovary and stipe rusty silky; stipe sometimes partly glabrous; style glabrous, sometimes only at the very top; stigma abruptly peltate, not very large. Pods broad-oblong, about 14 cm long, about 5 cm wide, delicately rugose, glabrous, flat, about 5-seeded seeds 1.5—2.5 cm across, albuminous; funicle obliquely conical, its branches nearly $\frac{1}{4}$ as long as the circumference of the seeds.

TYPE.—Description and plate in Rumph., *Herb. amb.* 5: 1 pl. 1. 1747.

DISTRIBUTION.—Malaysia: Philippines: Luzon (Benguet, Lepanto, Ilocos Sur, Montalban, Bontoc), Mindoro, Cebu, Leyte, Mindanao, Palawan; Indonesia. Celebes (Manado, SW Celebes, Malino, Bulu Tanah; Maki; Lompasang; Lepo-lepo near Kendari; Toljambu; Maros; Pankadjene; Bau-bau; Tasese), Morotai, Amboina (Soja di atas), Ternate (Foramadihi), Saleier, Batjan, Buru, Ceram (Laiurvin, Wai Nief; Wai Tuhu; Wai Tum), Sula Is., Taliabu Is., Kay Arch.; Netherlands New Guinea (Biak near Sarido; Nabire, Boemi R., Dore; Andai; Momi; Warsoevi, S of Manokwari; near Hollandia).

ECOLOGY.—From sealevel to 950 m altitude, "in thickets and forests," on lime rocks or volcanic tuffs, in (very) dry localities. Flowers yellow or

white. Beguin noted in Ternate that the flower was green-white, the filaments red, the style reddish. Kostermans (at Momi) found it in coastal plain forest, on stony soil, as a woody climber (filaments slightly pink at base). F. M. Bayer (near Hollandia) found it in flower in April; the white, yellow-veined petals discoloured yellow; the stamens were red. At Nabire and Momi, Netherlands New Guinea, Kanehira and Hatusima found it on the edge of rain-forests at 50 m altitude, flowering in March and April.

LOCAL NAMES.—Banot (Tagalog), banlut (Cebu Bisaya) (Philipp.); kali bambang (Celebes), walisu (Minahasa), madakaka (Ternate), buah parang (Buru), kaha gogaja (Ceram), madakaka, salisou, daun lida-lida, daun lolah munut, tabla mulu (Ambon), sukasari (Tobelo); yellow ebony vine (English).

USES.—Rumphius (Herb. amb. 1: 61. 1741) noted that leafy twigs, after scalding, were extracted in the juice of *Arenga* 'to impart bitterness,' but, he stated, it becomes only wry, not truly bitter. The tough twigs are used for tying, the leaves are eaten as a vegetable cooked or fresh.

The epithet 'lingua(e)' was coined by Rumphius and alluded to the tongue-like lobes of the leaf. Linnaeus reduced *Folium linguae* Rumph. to his *Bauhinia scandens* (in Stickman, Herb. amb. 18. 1754; Amoen. Acad. 4: 128, 1759). De Candolle referred *B. scandens* to his own *B. lingua* and excluded the synonyms Linnaeus adduced from Rheedé.

Phanera lingua and *Ph. semibifida* (Roxb.) Benth. have often been confused and are, in some cases, not easily distinguished as both are variable and closely related, though perfectly good, species, *Phanera lingua* is characterized by its long, (narrowly) cylindrical, basally not dilated, striate receptacle which is as a rule considerably longer than the sepals, and its inflorescence is as a rule rusty woolly hirsute. Its style is, at least partly or perhaps only at the top, glabrous, the stigma is peltate, round, often grooved. *Phanera semibifida* is characterized by a short, wide, basally (as a rule) distinctly widened, not striate receptacle which is as a rule much shorter than the sepals, the inflorescence is usually finely puberulous or even glabrescent, rarely hirsute. Its stigma is very large, acute-topped dorsally, oblique, the widened ending of an, as a rule, thick, short style. The petals of *Ph. lingua* are externally evenly, densely or sparsely, appressedly silky pilose whereas the petals of *Ph. semibifida* are sparsely hairy in the median zone only.

No type is known to exist of Roxburg's *Bauhinia cordifolia*. The name is best placed here. The types of *B. teysmanniana* Scheffer (Teysmann s.n., Andaij; BO), *B. antipolaya* Perkins (Merrill 1317; holotype, K), *B. pinhotiana* Perkins (Cuming 1119; holotype, K) belong here.

13. *Phanera merrilliana* (Perk.) de Wit, *comb. nov.*

Bachinia merrilliana Perkins, *Fragm. Fl. Philipp.* 1: 10. 1904.

A shrubby climber, up to 10 m long; tendrils weak; young parts rusty tomentose. Leaves about $\frac{1}{2}$ or deeper bifid broadly ovate to obovate, 7—9-nerved, 3—4.5 cm long and wide; base deeply cordate; top-lobes rounded; on the lower surface woolly pubescent, gradually glabrescent; petiole slender, pubescent, 1.3—1.6 cm long; stipules obovate, broadly rounded, on both surfaces pubescent, about 6 mm long. Inflorescences on top of short lateral branchlets along the twigs, appearing on top of leafy shoots, rusty silky pubescent. Flowers in dense, conical or pyramidal, slender-topped racemes, on 1.5—2 cm long, densely pubescent pedicels; bracts (narrowly) ovate, acute, 7—10 mm long, pubescent; bracteoles similar, 4 mm long. Buds ellipsoid, apiculate. Receptacle broadly cylindrical, slightly dilated at the base, 4—6 mm long, silky pubescent. Sepals free, reflexed, 11 mm long, narrow, acute. Petals ovate, acute, long-clawed (claw 4 mm long, pubescent), blade about 1 cm long, glabrous except for the sparsely pubescent central zone externally and a few hairs internally in the central zone. Stamens about 1.5 cm long; filaments on top capillary, gradually thickening towards the base, glabrous; anthers 4—5 mm long, splitting lengthwise; reduced stamens 2.5 mm long, glabrous; staminodes 3, subulate, 2 mm long. Ovary densely silky pubescent; style short, entirely silky pubescent; stigma the broadened, disc-shaped ending. Pods woody dark brown, shiny, 11—12 cm long, 3 cm wide; seeds (*vide* Perkins) 5—7, compressed-orbicular, 1.3 cm across.

TYPE.—Merrill 694 (holotype; A).

DISTRIBUTION.—Malaysia: Philippines: Palawan (Paragus, E-wi-ig R.; Lapu-lapu; Puerto Princesa, Mt. Pulgar; M. Binohan).

ECOLOGY.—Flowering throughout the year; the white flowers turn yellowish to orange. Apparently locally common, from sealevel to medium altitude.

LOCAL NAMES.—Sasinit, managas (Paragua).

Sometimes samples of poorly developed *Ph. semibifida* (Roxb.) Benth. are referred to *Ph. merrilliana*. The latter is to be distinguished by its larger bracts and bracteoles, smaller stigma and long, very dense, caudate or pyramidal (narrow-topped) inflorescences; the leaves are smaller and have fewer nerves.

14. *Phanera pachyphylla* (Merr.) de Wit, *comb. nov.*

Bachinia pachyphylla Merrill in Philipp. J. Sci. (Bot.) 27: 24. 1925; Enum. Philipp. fl. Pl. 4: 252. 1926.

A climber; tendrils few; young shoots not seen, probably ferruginous-puberulous. Leaves broadly ovate to suborbicular, $\frac{1}{3}$ — $\frac{2}{3}$ bifid, firmly coriaceous, more or less bullate, 11-nerved (midrib slender), the connecting nerves very prominent on the lower surface (reticulations

distinct), about 10 cm long and as wide; base deeply cordate, lobes rounded; top-lobes obtuse; lower surface at first very sparsely woolly hirsute, glabrescent, on the nerves woolly pubescent; petiole sturdy, about 1 cm long, glabrous; stipules not seen. Flowers in 20—30 cm long, narrow racemes (axis comparatively slender, more or less zig-zag, woolly brown tomentose, with elevated warts), on thick, 1.5—2 cm long, brown tomentose pedicels; bracts about 7 mm long, woolly tomentose, ovate, acute; bracteoles equally long but much narrower, woolly tomentose, at the base of the pedicel. Buds broadly ellipsoid, more or less smooth. Receptacle tubular, not dilated at the base, gradually widening towards the mouth, 16—18 mm long, brown woolly tomentose. Sepals narrow, strap-shaped, finally free, about 13—14 mm long, apparently not reflexed. Petals externally coppery tomentose, the blade about 1.5 cm long, tapering to an about 10 mm long claw, rounded. Stamens 1.5 cm long; filaments glabrous, somewhat glandular; anthers narrowly ellipsoid, about 7 mm long. Ovary on a short, pubescent stipe, entirely densely coppery tomentose; style slender, short, tomentose; stigma small, peltate. Pods thin-valved, about 13 cm long, 3.5—4 cm broad, appressedly rusty pubescent, finally glossy and glabrous; seeds about 6, disc-shaped, albuminous, about 1.5 cm across; funicular branches $\frac{1}{2}$ the circumference of the seed.

TYPE.—Loher 12978 (holotype; K).

DISTRIBUTION.—Malaysia; Philippines: Luzon (Rizal, Balinlingan).

ECOLOGY.—Only the type is known so far. It was collected at about 1400 m altitude, and had fruits and flowers in April.

A "strongly marked" species. It belongs with *Ph. semibifida* (Roxb.) Benth. and *Ph. lingua* (DC.) Miq., but is very well distinguished from both.

15. *Phanera pauciflora* (Merr.) de Wit, *comb. nov.*

Bauhinia pauciflora Merrill in Philipp. J. Sci. (Bot.) 10: 13. 1915.

A climbing shrub with tendrils; young parts rusty pubescent; branchlets slender, zig-zag, glabrous. Leaves ovate, more than $\frac{1}{2}$ to $\frac{3}{4}$ bifid, chartaceous, 9—11-nerved (nerves stout, very prominent on the lower surface), 8—10 cm long, 4.5—6 cm wide; base broadly cordate; top-lobes tapering, blunt to acuminate, sinus wide; upper surface shining, lower dull, thinly appressedly rusty pubescent, on the nerves denser so; petioles slender, 3—4 cm long, glabrous; stipules not seen; intrastipular trichomes equal, numerous, subulate, less than 0.5 mm long. Racemes terminal, few-flowered, rusty-pubescent, axis at most 10 cm long. Flowers 1—3 in a raceme; pedicels slender, about 2 cm long rusty puberulous, bracts ovate, acute, outside thinly pubescent, inside glabrous; bracteoles linear, acute, pubescent, about 5 mm long. Buds oblong-obovoid, more or less apiculate, thick, brown puberulous. Receptacle cylindrical, ribbed, 1.5—2.5 cm long, sparsely short-puberulous. Sepals strap-shaped, acute, 2.5—3 cm long, finally free and reflexed, pubescent externally. Petals oblong-ovate, obtuse.

about 3 cm long including and gradually narrowing into the 5 mm long, fleshy claw, externally in the median zone sparsely silky hirsute to nearly glabrous. Stamens about 2.5 cm long; filaments glabrous; anthers broadly oblong, 7—10 mm long, connective very broad; staminodes 2, 1 cm long. Ovary appressedly brown silky pubescent (entirely so or the centre only), 6-ovulate; stipe and style glabrous or not; stigma large, swollen, peltate.

TYPE.—Foxworthy and Ramos, Bur. Sci. 13113 (holotype; K).

DISTRIBUTION.—Malaysia: Philippines: Luzon [Tayabas, Dap-dap point; Rizal (Castilla)].

ECOLOGY.—In forests, flowering in March; flowers white or somewhat yellowish.

Phanera pauciflora is, apparently, a rare species, endemic in the Philippines. It is the closest approach in *Phanera* to *Bauhinia*. The leaf-shape is suggestive of *Bauhinia* and the intrastipular trichomes are stronger developed than is usually the case in *Phanera*. The type material allows no decision whether the calyx was spathaceous or not. Loher 5951, a specimen from Rizal, provided proof that the sepals become free on anthesis and are finally reflexed. The presence of tendrils and the phaneroïd characters of the ovary and stigma further indicate that *Bauhinia pauciflora* belongs in *Phanera*.

16. *Phanera riedelii* (Baker f.) de Wit, *comb. nov.*

Bauhinia riedelii Baker f. in J. Linn. Soc., Lond. (Bot.) 15: 98, 1877. — *Bauhinia wincananae* Koord. in Meded. 's Lands PIT. 19: 629, 1898. — *Bauhinia perkinsiae* Merr. in Bull. Govt Lab. Philipp. No. 17: 21, 1904. — *Bauhinia ferruginea* Roxb. *sensu* Perkins, *Fragm. Fl. Philipp.* 1: 9, 1904.

16a. Var. RIEDELI.

A woody climber, tendrils few, young parts and branchlets brown velvety tomentose, gradually glabrescent. Leaves ovate-orbicular, $\frac{1}{2}$ to nearly bifid, firmly chartaceous, 11—13-nerved, (8—)12—14(—17) cm across; base deeply cordate; top-lobes broadly rounded to acute; upper surface soon glabrous (the twin joint near the petiole remaining pubescent), apparently dull, lower surface brown woolly pubescent, very densely so on the nerves; petiole woolly brown tomentose, stout, 3—6 cm long; stipules orbicular or elongate-rhomboid, round-topped, 8—10 cm long, outside pubescent or more or less glabrous, inside glabrous. Flowers in a finally 15—20 cm long, brown velvety tomentose raceme, with stout axis, on thick, (1.5—)2.5—4 cm long, brown tomentose pedicels; bracts oblong, acute, about 1 cm long, tardily caducous. Buds brown tomentose. Receptacle narrow, tubular, not or very slightly dilated at the base, vaguely striate, about 2(—3) cm long. Sepals free, irregularly reflexed, strap-shaped, acute, 0.8-1.2 cm long. Petals recurved, obovate or oblong, obtuse or acute, 1.5—2.5 cm long (including the 5 mm long, hairy claw), crenate, densely coppery tomentose externally. Fertile stamens 15—18(—22) mm

long; filaments glabrous, anthers broadly elliptic, 7—10 mm long; reduced stamens 2, about 6 mm long. Ovary on a slender, reddish pubescent stipe, tomentose; style 4—5 mm long, entirely pubescent or partly glabrous; stigma warty, more or less capitate or peltate, small.

TYPE.—Riedel s.n. per Meyer, 1875 (holotype; K).

DISTRIBUTION.—Malaysia; Philippines: Palawan (E-wi-ig R., near Puerto Princesa), Mindanao (Surigao); Celebes (Manado; Gorontalo), Halmahera (Tugosir).

ECOLOGY.—In rather dry thickets, along the river, at low altitudes; flowers yellowish white (type locality of Merrill 731, holotype of *Bauhinia perkiana* Merr., l.c.). Also on volcanic tuff; on Halmahera in primary forest (de Haan 241).

LOCAL NAMES.—Baling (Tagbanua; Philipp.), kom-kom or lungar ari (Celebes).

I have long hesitated whether *Phanera riedelii* ought to be considered a good species or that it were better to reduce it to a variety of *Ph. dasycarpa* Miq. It is, however, best maintained as a species though closely related to several others. From *Ph. aheriana* (Perk.) de Wit it differs by its smaller, clawed petals, woolly brown tomentose petioles, buds, and pedicels, and larger stipules. From *Ph. dasycarpa* var. *ridleyi* (Prain) de Wit it is different in its much smaller stigma, long pedicelled flowers, and a longer receptacle. It links, therefore, a group of species consisting of *Ph. aheriana*, *Ph. griffithiana* Benth., *Ph. hallettii* (Prain) de Wit, and *Ph. ferruginea* (Roxb.) Benth. to the varieties of *Ph. dasycarpa* and to *Ph. pachyphylla* (Merr.) de Wit, while there is also an evident relationship to *Ph. lingua* (DC.) Miq., from which it is distinguished in having the petals more densely tomentose, the leaf-blades and inflorescence somewhat more rougher hairy, and the pedicels slightly stouter. There are only two reduced stamens and the stipules reach a length of 1 cm being membranaceous, more or less orbicular.

Koorders 17564 (holotype of *Bauhinia minahassae*; BO) belongs here.

The specimen from Mindanao is Wenzel 2537 and the only sample of *Ph. riedelii* of that island I have seen so far. *Phanera riedelii* links the eastern and western representatives of section *Meganthera*.

16b. Var. *fabrillii* de Wit, var. nov.

Varietas staminibus manifeste longioribus, foliis maioribus plurinervis a varietate *riedelii* distincta.

A woody, more than 60 m long climber, young parts and more or less quadrangulate branchlets red rusty, woolly tomentose. Leaves broadly ovate, nearly $\frac{1}{2}$ bifid, subcoriaceous, 15—17-nerved, 15—22 cm long and 14—16 cm wide; base deeply and widely cordate; top-lobes broadly rounded; upper surface shiny, glabrous (except the twin joint), lower surface

loosely woolly pubescent, except for the appressedly tomentose nerves, petiole woolly tomentose, stout, about 7 cm long, stipules not seen. Flowers in dense, short, stout-stemmed, velvety, 10—12 cm long inflorescences, on rather stout, about 4 cm long, red rusty tomentose pedicels; bracts broadly based, ovate-oblong, acute, about 12 mm long, 5 mm wide, silky; bracteoles oblong, acute, 9 mm long, placed near the middle of the pedicel. Ribs on the tomentose buds vaguely raised. Receptacle tubular, rather wide, not dilated at the base, vaguely striate, 17—20 mm long. Sepals free but tardily separating, irregularly reflexed, strap-shaped, acute, 20—25 mm long. Petals apparently not recurved, obovate, about 2.5 cm long, appressedly silky outside (except the margins), vaguely crenate, gradually narrowing in to a long claw. Fertile stamens about 4.5 cm long, filaments glabrous; anthers 8—9 mm long, reduced stamens 2. Ovary on a red-brown pubescent stipe, entirely silky pubescent, style about 0.5 cm long, upper half glabrous; stigma grooved, peltate, medium-sized. Pods unknown.

TYPE.—Anthony A 756 (1948; holotype; L).

DISTRIBUTION.—British North Borneo: Sandakan (Elopura Forest Reserve, at Krettam Besar).

ECOLOGY.—Occurred in thick forest, at 50 m altitude; the flowers were white, turning yellow, collected in March.

LOCAL NAME.—Tagalap (Sungei).

USES.—Used for weaving coral fisher's fencing by the Suluks, also as tying material for the floors in native houses.

Phanera riedelii var. *fabrilis* is in much the same manner related to *Ph. riedelii* var. *riedelii*, as is *Ph. excelsa* var. *aurora* de Wit to *Ph. excelsa* Bl. ex Miq. var. *excelsa*: they differ mainly by a difference in the number of nerves to the leaf, the length of the stamens, size of the leaves, and the length of the petiole.

17. PHANERA SEMIBIFIDA (Roxb.) Benth.—Fig. 15

Phanera semibifida (Roxb.) Benth in Pl. Jungh. 263, 1852; Miq., Fl. Ind. bat. 1 (1): 61, 1855. — *Bauhinia semibifida* Roxburgh, Hort. beng. 31, 1814, nomen nudum; Fl. ind., ed. Carey, 2: 330, 1832; ed. Clarke, 348, 1874; Wall., Pl. as. rar. 3 pl. 253, 1832; Wight, Ic. Pl. Ind. or. 1 (14): pl. 263, 1840; Baker in Hook. f., Fl. Br. Ind. 2: 280, 1878; Prain in J. As. Soc. Bengal 66 (2): 182, 184, 185, 499, 502, 1897; Gagnep. in Fl. gén. Indo-Chine 2: 130, 1913; Ridley, Fl. Mal. Pen. 1: 627, 1922. — *Bauhinia grandis* Kerth, ex Miq., Fl. Ind. bat. 1 (1): 61, 1855, in syn. — *Phanera sumatrana* Miq., Fl. Ind. bat. 1 (1): 1078, 1858. — *Bauhinia ferruginea* var. *excelsa* ("Bl. ex Miq.") Baker in Hook. f., Fl. Br. Ind. 2: 283, 1878, quoad specim. — *Bauhinia* (*Phanera*) *stenostachya* Bak. f. in Kew Bull. 1896: 22. — *Bauhinia* (*Phanera*) *stenostachya* Merr. in Philipp. J. Sci. (Bot.) 3: 230, 1908; Enum. Philipp. fl. Pl. 2: 261, 1923. — *Bauhinia borneensis* Merr. in Philipp. J. Sci. (Bot.) 11: 78, 1916.

17a. VAR. SEMIBIFIDA

A scandent shrub or liana; tendrils few; young parts brown-pubescent. Leaves ovate to rounded (or obovate), sometimes broader than long,

$\frac{3}{4}$ — $\frac{2}{3}$ bifid, very rarely emarginate, coriaceous to chartaceous, (9—)11—13-nerved, 4—11 cm in diameter; base cordate; top-lobes (broadly) rounded to acute; upper surface shining, glabrous, sometimes finely reticulate, lower, (minutely appressed) brown pubescent to glabrescent; petiole 2—6 cm long, pubescent to glabrous; stipules auriculate, more or less orbicular, crisped, glabrous or minutely puberulous. Flowers in terminal and lateral, short or long, short-downy racemes, on pubescent, 3—6 cm long pedicels; bracts very early caducous, lanceolate, silky puberulous; bracteoles linear, acute, 8 mm long, ciliate. Buds thick, ellipsoid or oblong, apiculate, puberulous to pubescent. Receptacle short and wide, ampulliform to influndibuliform (base dilated), 0.5—1 cm long. Sepals twice or more as long as the receptacle, free, narrowly strap-shaped, reflexed, 1—2.5 cm long. Petals (narrowly) oblong to ovate, decreasing in size, 2—3(—3.5) cm long, up to 1.8 cm wide including the about 2—4 mm long claw, glabrous except for the pubescent claw and externally sparsely hirsute in the median zone, sometimes the largest (outer) petal externally entirely thinly pubescent. Stamens up to 2.5(—3) cm long; filaments stout, glabrous; anthers large, oblong, 1 cm long; staminodes 2—3, small. Ovary, stipe, and style entirely densely silky tomentose; ovary 8—12-ovulate; style short, rarely about 1 cm long, stout, increasing towards the warty, very large, oblique semi-peltate stigma up to 5 mm across. Pods flat, smooth, oblong, glabrous, about 6-seeded; seeds flat, varying in size, albuminous; hilum $\frac{7}{8}$ the circumference of the seed.

TYPE.—To be designated in the Kew Herbarium.

DISTRIBUTION.—Malaysia: Malay Peninsula: Singapore (Bukit Mundi; Bukit Timah Res.); Philippines: Mindoro, Mindanao, Palawan, Panay, Paragua; Borneo: Sarawak [Mt. Rayon; Mt. Sengghai; Kapit (Upper Rejang R.)], British North Borneo (Tawao, Sandakan; Kuching; Mt. Kinabalu; Dallas; Kiau; Penibukan); Sumatra (Asahan, Bander Pulau; Palembang, Banjumas; Padang, Lubuk Salasih; Damuli; Mt. Pakiwang; NW. Lake Ranau); Mentawai Is.; Lingga Arch.; Indonesian Borneo (Pontianak; Sudjau; Bukit Liang Karing; Bukit Milo; Kapuas; E. Borneo, Bungalun; Sungai Blu-u; Sungai Tinggi; W. Kutai (Kombeng; Wahau); Celebes (Manado, Taripa-Pape).

ECOLOGY.—In Malaysia in general it occurs from 200 to over 2000 m altitude in forests or old jungles. Elmer (20067) noted: "rambling over thickets near tide water" (British North Borneo, Myburgh Prov.). — The largest petal has on its inside at the tip some loose tissue excreting



FIG. 15. *Phanera semibifida* (Roxb.) Benth.: left, flower, $\frac{2}{3}$ \times ; right, ovary, $2\frac{1}{2}$ \times .

a sticky juice (honey?). The standard is distinguished by being smallest and by a much more hairy claw than the others. The mouth of the receptacle is never closed. The stamens and staminodes are of the outer whorl. The inner whorl is reduced to one or two minute (less than 0.5 mm long) anterior filaments. — The flower is described as "yellow" (Sarawak) or white (Sandakan, Evangelista). C. J. Brooks notes: "anthers brown, pistil white green at extremity" (Bidi, Borneo). Furtado wrote (Nov. 5, 1927), in Singapore Gardens: "stipules red . . . , sepals green tomentose outside, whitish inside . . . , petals white first, then yellow-green, persist for a long time after sepals and stamens . . . white filaments, staminodes 2, pure white, style yellowish green . . . stigma green." On Singapore Island, Ngadiman found the flowers "slightly fragrant, the petals white, faintly pink tinged, fading pale yellow" (Bukit Timah). Rutten (47) found it in an old clearing as a 20 m tall, white-flowered tree in East Borneo. Enderb (2389) says that the flower is not scented (West Kutai).

LOCAL NAMES.—Kupu (West Borneo, Pontianak), takui lebang (Sungei), akar kati katwi (Sumatra, Ophir), andor sibola ringring (Asahan), bulung siduaju (Simalur), akar pulalang (Djambi), ganggang katup (Lingga).

USES.—Pounded roots in water as a physic against venereal disease (Lingga).

Roxburgh (*l.c.*, 1832) said that his *Bauhinia semibifida* was "native of the Malay Archipelago; from Sumatra it has been introduced into the Botanic Garden at Calcutta where it blossoms in October and November, the seeds ripen in April." This agrees with the period of flowering at Singapore though it seems that a second period of flowering occurs in June.

Ridley observing that there was some difference between the pictures of *B. semibifida* made by Roxburgh and by Wallich, stated: "It was formerly at least common in Singapore and our only wild Bauhinia there."

Phanera semibifida, being widely distributed and composed of more or less isolated populations, is variable in its morphology. At first sight, when two specimens are compared, for instance one from the Malay Peninsula or northern Borneo (rounded, broad leaves, thick buds, short, widely ampulliform receptacle) and the other from the Philippines (acutely lobed, glossy leaves, comparatively narrow receptacle, narrow, crested buds) it seems difficult to accept them as conspecific. The large suite of specimens I have examined have demonstrated that these extremes, and other more or less divergent forms, cannot be separated, though some infraspecific taxa, which are mostly confined to limited areas, may be distinguished. De Voogd collected in Sumatra a specimen with thick buds, which closely approached the Malay Peninsular specimens (though they

were larger-leaved) and I cannot suggest for this reason, what form Roxburgh based his name on. Achmad (617) collected on Simalur Island specimens with exceptionally large and broad leaves, large flowers, and which were almost glabrous; they are an approach to variety *subglabra* (see below).

Phanera lingua (DC.) Miq. is a closely related species, distinguished mainly by its narrow, tubular receptacle, which is not dilated at the base and almost always exceeds the sepals in length. The slender style is glabrous or glabrescent and the peltate stigma decidedly smaller. All petals are externally pilose on the whole of their surface, not with sparse hairs in the median zone only.

The holotypes of *Bauhinia borneensis* Merr. (Native Collector 1906; A) and *Ph. sumatrana* Miq. (Teysmann, ad litus, Siboga, s.n., H.B.858; U) belong here.

17b. Var. *excurrens* (Stapf) de Wit, var. & stat. nov.

Bauhinia excurrens Stapf in Trans. Linn. Soc., Lond. II 4: 143. 1894.

A climber, tendrils strong, woody. Leaves entire, (broadly) ovate 9—11 cm long, 6—7 cm wide, 11-nerved, base cordate; top suddenly and sharply acuminate to subacuminate-emarginate, lower surface sparsely appressedly puberulous to glabrescent; petiole slender, about 5 cm long, glabrous. Pedicels about 4 cm long, finely puberulous; bracts early caducous, not seen, bracteoles linear-subulate, 7 mm long, with some sparse, ciliate hairs. Buds large, thick, delicately puberulous to more or less glabrous. Receptacle widely tubular, not or slightly dilated at the base, up to about 1 cm long. Petals nearly glabrous.

TYPE.—Haviland 1382 (holotype of *Bauhinia excurrens*; K).

DISTRIBUTION.—Malaysia: British North Borneo: Mt. Kinabalu (Tampassuk, Kung; Kinataki R.).

ECOLOGY.—Flowering in August, altitude about 600 m.

This variety is a link between *Ph. semibifida* var. *semibifida* and var. *subglabra* (Merr.) de Wit. It is immediately distinguishable from both by its leaf-apex which is entire and sharply acuminate. In the Clemens's specimens from Kinataki River (40117A), the top is more or less acute and minutely emarginate. The buds are soon glabrous as is the lower surface of the leaf.

17c. Var. *stenostachya* (Baker f.) de Wit, var. & stat. nov.

Bauhinia stenostachya Baker f. in Kew Bull. 1896: 22.

A climber; branches woolly brown tomentose. Leaves $\frac{1}{2}$ bifid, usually broader than long, more or less orbicular, 13—15-nerved (nerves much branching, transversal nerves evident), 11—16 cm across; base

deeply cordate; top-lobes broadly rounded; upper surface glossy, lower surface brown woolly pubescent, tomentose on the nerves; petiole glabrescent, 7—8 cm long; stipules obovate-falcate, 8—10 mm long, externally sparsely pubescent, inside glabrous, rounded. Pedicels sturdy, up to 4 cm long, tomentose; bracts linear, 8 mm long; bracteoles smaller, below the middle of the pedicel. Buds oblong, 5-grooved, apiculate. Receptacle ampulliform, silky brown tomentose, about 1 cm long, grooved. Sepals free, spreadingly reflexed, 2.5 long. Petals 2—2.5 cm long, distinctly clawed, apiculate. Ovary dark brown, silky tomentose; stigma warty, very large.

TYPE.—Creagh *s.n.*, anno 1895 (holotype of *B. stenostachya*; K).

DISTRIBUTION.—Malaysia: Borneo: British North Borneo: Sandakan; Elphinstone Prov.-(Tawao): East Borneo (Bungalun).

ECOLOGY.—Rutten (743) found it near Bungalun in primary forest on a river bank on clay, at 15 m altitude; the petals were light yellow and it was an about 3 m long liana. Elmer (20674) noted: "Leaves sub-lucid above and subglaucescent green beneath" and "very dark green stigmas."

17d. Var. *subglabra* (Merr.) de Wit, var. & stat. nov.

Bauhinia subglabra Merrill in Philipp. J. Sci. (Bot.) 3: 230. 1908.

A climber, 3—5 m long. Leaves broadly ovate, 2/5 bifid, firmly chartaceous, about 11-nerved; base deeply cordate; top-lobes rounded, tapering, not quite acute; petioles very slender, 4—5.5 cm long. Flowers in glabrous, elongate racemes, on 2—3 cm long, glabrous pedicels; bracts and bracteoles early caducous. Receptacle tubular, very slightly dilated at the base, about 14 mm long. Sepals slightly exceeding the receptacle. Petals broadly lanceolate, nearly 3 cm long, clawed, externally slightly pubescent. Stamens nearly 2.5 cm long; anthers 12 mm, very broadly elliptic. Ovary and style densely rusty tomentose; stigma very large, the broadened, peltate ending of the style.

TYPE.—Foxworthy, Bur. Sci. 821 (holotype; K).

DISTRIBUTION.—Malaysia: Philippines: Palawan (Iwahig; Puerto Princesa, Mt. Pulgar); Simalur.

LOCAL NAME.—Mahara sidua fulung (Simalur).

Phanera semibifida var. *subglabra* differs from *Ph. semibifida* var. *semibifida* only by its glabrous buds and inflorescences. The leaves were described as glabrous, but on the lower surface they are sometimes sparsely and delicately appressedly pubescent, especially when young. The specimen from Simalur (Achmad 461) was collected in a marsh.

18. PHANERA STIPULARIS (Korth.) Benth.

Phanera stipularis (Korth.) Benth in Pl. Jungh. 263. 1852; Miq., Fl. Ind. Bat. 1 (1): 65. 1853. — *Bauhinia stipularis* Korthals in Verh. nat. Gesch., Bot. 92. 1841. — *Phanera albolutea* Miq., Fl. Ind. bat. 1 (1): 1079. 1858. — *Bauhinia albolutea* Prain in J. As. Soc. Bengal 66 (2): 181. 1897; Ridley in J. Fed. Mal. St. Mus. 8: 30. 1917.

A tendrilled climber, branchlets terete, at first short-tomentose, young parts rusty pubescent. Leaves $\frac{1}{2}$ bifid, 9—11-nerved, 6—7.5 cm long and 3—3.5 cm wide; base deeply cordate; top-lobes acutish to broadly rounded; lower surface densely pubescent (silky when young), gradually glabrescent; petiole 3—4 cm long, slender, glabrescent; stipules suborbicular to reniform, inside nearly glabrous, externally pubescent, about 6 mm long. Flowers in lateral or terminal, short, nearly corymbose racemes, on triangular, more or less sulcate, densely pubescent, 4—5 cm long, slender pedicels; bracts and bracteoles narrowly triangular, long acute, pubescent, 5(—3) mm long. Buds apiculate, densely silky puberulous, broadly ellipsoid. Receptacle at its base dilated, ampulliform to narrow, 6—10 mm long, striate. Sepals 5, 18—22 mm long and 3 mm wide, strap-shaped, reflexed, free. Petals nearly equal, (broadly) ovate, blunt, suddenly constricted into a 5 mm long claw, (3)—8—12 mm wide and (1.5—) 2—3 cm long (including the claw), externally very sparsely pilose in the median zone. Fertile stamens 25—30 mm long; filaments glabrous; anthers elliptical, 6—8 mm long; reduced stamens 2. Ovary silky pubescent, on a long, densely silky pubescent stipe, 3-ovuled; style about 2 cm long, rather slender, glabrous; stigma capitate-truncate. Pods linear, woody, brown.

TYPE.—Korthals *s.n.* (L. 908.107—1410).

DISTRIBUTION.—Nicobar Is.; Malaysia; Mentawai Is. (Siberut), Nias I., Sumatra [West Coast, Mt. Korintji; Padangsidempuan; Tapanuli; Sibolangit; Deli-Atchin border (East Coast), Palembang (R. Rupit); Asahan (Bunut; Guru batu), Mt. Pakiwang; Lampongs (Wai Lima Est.)].

ECOLOGY.—Flowers yellow (Yates 961, Asahan) or white, slightly fragrant; stamens dark-red. The Banghams collected this at sealevel (Deli-Atchin) on the edge of a mangrove swamp. The type is from Mount Singalang, Sumatra, from about 500 m altitude. Bunnemeijer (8929, 9086) found it on Mount Korintji at 1500 to 1700 m altitude, flowering in March. The flower is once reported to be white with red markings.

LOCAL NAMES.—Selaun (Sumatra, West Coast), akar katut katut (Sumatra).

The holotype of *Ph. albolutea* Miq. (Teysmann, Padangsidempuan, H.B.857; U) belongs to *Ph. stipularis*. The differences mentioned by Prain (who did not examine the type of *Ph. albolutea*, but used the data contained in Miquel's description) do not exist.

Section 3. *Micranthera* de Wit, *sect. nov.*

Sectio subgeneris *Phanerae*, sepalis ovatis vel ovato-oblongis, in 2—3 lobis coherentibus, alabastris subfusiformes, ovoideis, rarissime subglobosis, petalis crenatis sive crispis, antheris haud 3 mm superantibus longitudine distincta.

This new section of subgenus *Phanera* is distinguished by ovate or ovate-oblong sepals which are coherent in 2—3 lobes; subfusiform to ovoid, very rarely subglobose, buds; crenate or crisped petals; and 1—3

mm long anthers. The inflorescence is usually a corymb, rarely a short, very rarely an elongate, raceme.

TYPE SPECIES.—*Phanera integrifolia* (Roxb.) Benth.

This section is intermediate between subgenus *Biporina* and section *Meganthera*.

Subsection 3. *Chloroxantheae* de Wit, *subsect. nov.*

Folia usque ad plus quam dimidiam longitudinis laminae bifida. Alabastra haud magna, ovoidea vel anguste ovoidea. Inflorescentia corymbosa. Receptaculum turbinatum. Sepala cohaerentia in 2—3 lobis. Petala crispa, lamina ad unguem longissimum angustata. Stamina antheras latas, 1—3 mm longas gerentes. Ovarium longe stipitatum. Stigma parvum.

Leaves up to more than $\frac{1}{2}$ bifid. Inflorescence corymbose. Buds not large, ovoid or narrowly ovoid. Receptacle turbinate. Sepals coherent in 2—3 lobes. Petals crisped; the blade narrowing into the very long, slender claw. Stamens bearing broad, 1—3 mm long anthers. Ovary long-stiped. Stigma small.

TYPE SPECIES.—*Phanera involucellata* (Kurz) de Wit.

This subsection contains a number of species described for Siam [e.g. *Phanera similis* (Craib) de Wit, *comb. nov.*, basynym, *Bauhinia similis* Craib in Kew Bull. 1927: 391] and occurring on the south-eastern Asiatic continent. Type of the subsection is *Phanera involucellata* (Kurz) de Wit, *comb. nov.* (basynym, *Bauhinia involucellata* Kurz in J. As. Soc. Bengal 42: 72, 1873).

A closely allied taxon, so far not found to be present in Malaysia, comprises *Ph. bracteata* Grah. ex Benth. and some other species which have in common most of the characters of subsection *Chloroxantheae* but differ in having a produced, tubular receptacle-mouth and five free, reflexed sepals.

It seems that the flowers in subsection *Chloroxantheae*, and also in the allied taxon, are always yellowish, yellow-green or pallid green, and do not discolour when withering.

KEY TO THE MALAYSIAN TAXA OF SUBSECTION CHLOROXYANTHEAE

1. Blade of the petals gradually narrowing into a claw. Ovary fugaciously hirsute, soon glabrous. 20. *Ph. gracillima*
1. Blade of the petals suddenly contracted into a claw. Ovary persistently tomentose.
 2. Fertile stamens glabrous, 3—3.5 cm long, 2 or 3 present. All or only two petals purple-veined or blotched at the tip. . . . 19b. *Ph. bassacensis* var. *backeri*
 2. Fertile stamens hirsute or sparsely pilose, 1.5—2 cm long, 2 present. Two petals purple-blotched or all concolorous (greenish-yellow).
 - 19a. *Ph. bassacensis* var. *bassacensis*

19. *Phanera bassacensis* (Pierre ex Gagnep.) de Wit,
comb. nov.—Fig. 16

Bachinia bassacensis Pierre ex Gagnepain in Lec., Not. Syst. 2: 168. 1912; Gagnep. in Fl. gén. Indo-Chine 2: 124. 1913; Craib, Fl. siam. Enum. 1: 516-517. 1928. — *Bachinia viridiflora* Baker in Bull. Jard. bot. Buitenz. III 2: 323. 1929; Bekn. Fl. Java, Nooduitg., 5 (Fam. 118): 21. 1941, hand Ducke. — *Bachinia longipes* Merr. in Univ. Calif. bot. Publ. 15: 102. 1929. — *Bachinia bracteata* Grah. ex Baker sensu Ridley in J. Fed. Mal. St. Mus. 7: 40. 1919; Fl. Mal. Pen. 1: 634. 1922.

19a. VAR. BASSACENSIS.

A climber; tendrils at first weak, glabrescent, often early caducous; young parts rusty-tomentose. Leaves ovate to rounded, bifid (sinus wide or narrow), subcoriaceous, 9—13-nerved, 7—10 cm across; base cordate; top-lobes deltoid, obtuse to acute or subacuminate; upper surface glabrous, lower at first loosely woolly pubescent, glaucous; petioles stout, 4—7 cm long, glabrous or glabrescent; stipules about 6 mm long, ear-shaped, inside glabrous. Flowers in up to 15 cm wide, sometimes aggregate corymbs, on 5—8 cm long, slender, tomentose pedicels; bracts linear, acute, tomentose, 8—10 mm long; bracteoles slightly smaller, near the middle of the pedicels. Buds greyish brown tomentose, subfusiform to ovoid, acute, smooth. Receptacle not evident, about 1 mm long, turbinate, woolly pubescent. Sepals coherent in 2 pubescent, finally about reflexed lobes, 8—10 mm long. Petals with a 10—17 mm long, very slender, pubescent claw, blade broadly elliptic to orbicular, crisped, silky hairy on both surfaces (inside thinner and glabrescent), about 10 mm long, pallidly yellowish. Stamens 2 fertile; filaments (densely) rusty pubescent to sparsely woolly pubescent, 1.5—2 cm long; anthers broad, 1—2 mm long; reduced stamens and staminodes up



FIG. 16. *Phanera bassacensis* (Pierre ex Gagnep.) de Wit; leaves and inflorescence, $\frac{1}{2}$ ×.

to about 9 mm long, decreasing in length. Ovary pubescent, 7-ovulate; stipe and style long, pubescent; stigma small. Pods not seen.

TYPE.—Harmand 1540 (lectotype; P).

DISTRIBUTION.—Laos; Cochinchina; Cambodia; Siam (Chantaburi), Malaysia: Malay Peninsula: Kedah (Kedah Peak), Kelantan (Kuala Kini).

ECOLOGY.—Apparently flowering throughout the year. Low to medium altitude. Robinson and Boden Kloss noted at Gurun (foot of Kedah Peak): "flowers greenish white." At Kuala Kini, Moh. Haniff and Moh. Nur found the "petals cream yellow, the lower two with purple blotches."

Craib (*op. cit.* pp. 516, 517, 530) admitted the existence of a number of species closely allied to *Phanera bassacensis*. I am unable to follow him and incline to recognize at most some varieties in this species, which is somewhat variable in the appearance and persistence of the indumentum; similar varieties occur in some other species of *Phanera*, such as *Ph. lingua* (DC) Miq., *Ph. semibifida* (Roxb.) Benth., *Ph. kockiana* (Korth.) Benth., *Ph. integrifolia* (Roxb.) Benth., etc.

For *Bauhinia sulphurea* C. E. C. Fischer, see "Species excludendae vel rejiciendae."

19b. Var. *backeri* de Wit, var. & nom. nov.

Bauhinia viridiflora Backer in Bull. Jard. bot. Boissenz, III 2: 323. 1929. —
Bauhinia longipes Merr. in Univ. Calif. bot. Publ. 15: 102. 1929.

A climber or shrub; tendrils hairy, nearly opposite, one caducous; young parts brownish or grey pubescent, or tomentose. Leaves ovate to rounded, $\frac{2}{5}$ — $\frac{3}{5}$ bifid, subcoriaceous, 11—13(—15)-nerved, the midrib produced into the narrow sinus, 6—10(—18) cm across; base truncate to sub- (or deeply) cordate; top-lobes (sub-)acute to about acuminate or (more rarely) more or less rounded; upper surface smooth, glabrous, lower loosely pubescent to glabrescent; petiole stout, 3.5—5.5(—10) cm long; stipules flabby, ear-shaped, thinly puberulous, 5—7 mm long. Flowers in short terminal, brown or grey downy corymbs, on up to 9 cm long, pubescent, slender pedicels; bracts rather large, oblong, ovate, acute, pubescent, 8 mm long; bracteoles not opposite, in lower half of pedicel, slightly smaller, linear. Buds subfusiform, acute. Receptacle short-turbinate, grey silky, 2—2.5 mm long. Sepals coherent in 2 pubescent lobes, 10—13 mm long, reflexed. Petals with a 10—17 mm long, slender, pubescent claw, which is decidedly longer in the lower than in the upper petals; blade broadly ovate (base truncate to cordate), crisped, silky hairy on both surfaces, about 1 cm long, greenish-creamy and conspicuously veined, all or some with a purple blotch near the tip. Stamens 2 (or 3) fertile; filaments very thinly hairy, 3—3.5 cm long; anthers broad, 1—2 mm long; reduced stamens and staminodes 6—8. Ovary, stipe and style silky; stipe long; style 9—15 mm long; stigma capitulate, inconspicuous. Pods glabrous, flat, thin-valved, about 11 cm long, 3 cm wide, 2—4-seeded; seeds 15—17

mm long, notched at the hilum, about 10 mm wide, laterally compressed, albuminous; funicle conical, branches very long, leaving a linear scar.

TYPE.—Backer 8801 (lectotype; BO).

DISTRIBUTION.—Malaysia: British North Borneo (near Tawao; Bettotan, Sandakan), Java (West Java: Bodjong Lopang, Tjitjurug, Dampang Kulon; Tasik Malaja S of Nanggerang on Tjibatudja).

ECOLOGY.—Backer found this remarkable, 5—10 m tall liana in West Java between 300 and 700 m altitude, in forest margins or open forests, often on river banks. The flowers are light yellowish green and delightfully scented. The nerves of the leaves have, on the upper surface, when fresh a delicate red line throughout their length. The twin joint on top of the petiole in the base of the blade consists of two rather widely separated parts. The type was collected at 325 m altitude, Camp Denu, "Tji Patudja."

When publishing *Bauhinia viridiflora*, Backer stressed its affinity to *Phanera bracteata* Grah. ex Benth. but had not seen authentic material of the latter. Actually, *B. viridiflora* proved to be conspecific with an allied species, *Ph. bassacensis*, though the Javan specimens may be accepted as a variety distinguished by a purple blotch near the top of two or more petals and, occasionally, of a third fertile stamen. The filaments of the fertile stamens are longer and only very sparsely pilose.

Merrill described *Bauhinia longipes* (Elmer 21435, near Tawao, British North Borneo; holotype; K) as a scandent plant in damp forests in stream depressions, "the petals yellowish green, their tips on the inner side purplish."

20. *Phanera gracillima* de Wit, sp. nov.

Species subsectionis *Chlorozantheorum*, foliis parvis, 13-nervis, bilobatis, inflorescentiis corymbosis paucifloris, sepalis anguste-oblongis, petalis gradatim ad unguem longissimum attenuatis, ovario longe stipitato, stigmatibus inconspicuis distincta.

A slender climber; tendrils few, terete, glabrous; young parts loosely and fugaciously hirsute. Leaves more or less orbicular, mostly broader than long, $\frac{1}{2}$ bifid, chartaceous, 13-nerved (nerves very slender and sharp-edged on the back), 4—6 cm across; base very shallowly cordate to broadly cuneate; top-lobes broadly rounded, sometimes blunt; upper and lower surface more or less dull, the lower surface minutely appressed by puberulous but soon glabrescent, slightly denser so on the nerves; petioles 3—8 cm long, very slender; stipules triangular, narrow, acute, only thinly ciliate. Flowers in open, few-flowered, terminal corymbs, on slender, angulate, laxly pubescent, about 4 cm long pedicels; bracts narrowly linear, about 5 mm long, nearly glabrous; bracteoles subulate, about 4 mm long, near the middle of the pedicel. Buds oblong, long tapering. Receptacle turbinate, about 1.5 mm long, fugaciously pubescent. Sepals coherent in 2—3 lobes, finally more or less detached, narrow, 10—13 mm long,

acute, glabrescent. Petals 3—3.5 cm long (including the very slender laxly and thinly woolly pubescent 18—22 mm long claw), about 3 mm wide with oblong blade, erose margins, crenulate, outside thinly woolly pubescent, inside more or less glabrous. Fertile stamens about 1.5 cm long; filaments glabrous, slender; anthers narrowly elliptic, 3 mm long; staminodes small, connate to a 4—5-tipped ring. Ovary on a long, slender, glabrescent stipe, fugaciously hirsute, soon glabrous; style slender, glabrescent; stigma inconspicuous. Pods unknown.

TYPE.—Castro 4425 (holotype; SING).

DISTRIBUTION.—Malaysia: British North Borneo: Sandakan (Kabili-Sepilok Forest Reserve).

ECOLOGY.—At about 30 m altitude. Flowering in April. Flowers olive green, red inside.

LOCAL NAME.—Langkop (Murut).

Only the type is known; isotypes are at Kew and at Leyden.

Subsection 4. *Fulvae* de Wit, *subsect. nov.*

Subsectio foliis bilobatis, raro integris, inflorescentiis corymbosis, receptaculo tubulari, usque ad circa 5 mm longo, quam sepala breviora, sepalis liberis vel coherentibus in lobis 2—3, petalis anguste et manifeste unguilatis, staminibus gracilibus, antheris parvis, angustis, ovario stipitato, seminis non numerosis, funiculo late triangulari, distincta.

Leaves bifid or, rarely, entire. Flowers in corymbs. Receptacle tubular, up to about 5 mm long, shorter than the sepals. Sepals free or coherent in 2—3 lobes. Petals narrowly and manifestly clawed, stamens slender. Anthers small, narrow. Ovary stiped. Seeds not numerous, on a broadly triangular funicle.

TYPE SPECIES.—*Phanera fulva* Bl. ex Miq.

This new subsection consists in Malaysia of two species, one represented by three infraspecific taxa. One species is widely distributed (also occurring on the south-eastern Asiatic continent) and the other confined to Java and Sumatra.

The subsection is the nearest approach to subgenus *Biporina* and different only in its anthers splitting *lengthwise* and, less consistently, by its bilobed leaves. It is, therefore, a very satisfactory link between the two subgenera in *Phanera*; its distribution seems in agreement with its proposed taxonomical position.

KEY TO THE TAXA OF SUBSECTION FULVAE

1. Filaments of the stamens glabrous. Bracteoles at the base of the receptacle. Sepals finally free. Pubescence on the buds grey or tawny 21. *Ph. fulva*
1. Filaments of the stamens partly or wholly pilose or hirsute. Bracteoles below or slightly above the middle of the pedicel (in fully grown flowers). Sepals remaining coherent in 2—3 lobes. Pubescence on the buds ferruginous or coppery.

2. Sepals about 8 mm long. Leaves on the lower surface persistently fuscous woolly pubescent. Receptacle distinctly shorter than the sepals.

22c. *Ph. integrifolia* subsp. *evningiana* var. *symphaeifolia*

2. Sepals about 5 mm long. Leaves on the lower surface pubescent or glabrescent. Receptacle finally equalling or longer than the sepals.

3. Stamens about 13 mm long, decidedly shorter than the petals. Buds ovoid to subellipsoid. Pedicels up to 4.5 cm long. 22b. *Ph. integrifolia* subsp. *evningiana*

3. Stamens about 18 mm long, longer than the petals. Buds ovoid to about globular. Pedicels about 2.5 cm long.

22a. *Ph. integrifolia* subsp. *integrifolia*

21. PHANERA FULVA (Bl. ex Korth.) Benth.—Fig. 17.

Phanera fulva (Bl. ex Korth.) Benth in Pl. Jungh. 262. 1852; Blume ex Miguel, Fl. Ind. bat. 1 (1): 65. 1855. — *Bauhinia fulva* Blume ex Korthals in Verh. nat. Gesch. Bot. 91. 1841; Heyne, Nutt. Pl. Ned. Ind., 2de Druk, 726. 1927; Backer, Bekn. Fl. Java, Noodultg., 5 (Fam. 118): 20-21. 1941. — *Phanera juenghahniana* Benth. in Pl. Jungh. 263. 1852. — *Bauhinia corymbosa* Roxb. *sensu* Hassk. in Flora 25 (Beibl.): 98. 1842.

A climber, up to 15 m tall; young twigs densely woolly brown hairy, with hairy, paired (but not opposite) tendrils which may be placed on top of short branchlets. Leaves broadly (ob)ovate, (usually broader than long) or orbicular, $\frac{1}{3}$ — $\frac{1}{2}$ bifid (midrib produced into the narrow sinus), subcoriaceous, 11—13-nerved (nerves with strong branches), very variable in size, up to 20 cm in diameter (10—16 cm across); base narrowly and deeply cordate; top-lobes (broadly) rounded to acute; upper surface in young leaves puberulous, later glabrous, lower surface woolly pubescent, gradually glabrescent (except on the nerves); petiole pubescent, 4—8 cm long; stipules rounded, about 4 cm long, tomentose outside, glabrous inside. Flowers in simple or compound, terminal or lateral, brown woolly pubescent, 5—8 cm long corymbs, on up to 4 cm long, slender, grey-brown woolly pubescent pedicels; bracts ovate, broad, glabrous inside, outside densely puberulous; bracteoles close to the calyx tube, minutely subulate, woolly pubescent. Buds ovoid, with narrow top, grey pubescent. Receptacle cylindrical, 4—6 mm long, pubescent. Sepals at first in 2—3, finally



FIG. 17. *Phanera fulva* (Korth.) Benth. inflorescence, leaf, and flower, $\frac{1}{2}$ x.

more or less free, acute, 8—12 mm long, ovate, more or less reflexed lobes. Petals obovate, unequal, 1.5—2.2 cm long (including the 3—5 mm long green claw), externally appressedly hirsute (glabrescent laterally), inside glabrous, white turning yellow. Stamens 3 perfect; filaments 15—18 mm long, glabrous; anther narrowly oblong, about 2 mm long; staminodes 2, very small. Ovary on a short, pubescent stipe, velvety brown pubescent interspersed with longer hairs; style slender, abruptly glabrous in the upper half; stigma peltate. Pod 4—7-seeded, oblong, about 20 cm long, 4—5 cm broad, dark brown velvety; seeds flat-orbicular, notched at the hilum, albuminous, about 2 cm across; funicle conical.

TYPE.—Blume *s.n.*, Gunung Seribu (holotype: L 908.107-1069).

DISTRIBUTION.—Possibly in India. Malaysia: Sumatra (without locality), Java (Bantam, Malingping; Djakarta; Bogor; Priangan, Mt. Papandajan, Mt. Guntur; Banjumas, Bandjar, Madjenang, Nusa Kambangan; Jogjakarta, Kemedang).

LOCAL NAME.—Kupu (Nusa Kambangan).

ECOLOGY.—Pith in flowering twigs chambered. On lime rocks (always?), in light forests and jungles. Korthals stated to have found it between 600 and 1000 m altitude (Mts. Papandajan and Guntur); it may be found even near the beach at sealevel, but seems to become a rare plant. — Flowers appear from January to July. Backer states that they are fragrant. Young twigs have very deeply split laeves (wide sinus) with acuminate lobes and 11 cm long petioles.

USES.—A hot water extraction of the pounded roots is given for fever and diarrhoea; also for treating coughs.

Some specimens with exceptionally glabrous leaves have been named "var. *glabrata*" by Blume (MS.) and "*glabrior*" by Miquel (*l.c.*) but there is no sufficient reason to keep them as distinct taxa.

The only Sumatran specimens I have seen are Forbes 1880a and 2594.

Phanera fulva is closely allied to *Ph. integrifolia* (Roxb.) Benth. and from a geographical point of view, appears to hold a position similar to that of *Ph. finlaysonian* var. *javanica* (Backer) de Wit and *Ph. bassacensis* var. *backeri* de Wit in their respective species. I felt, however, that *Ph. fulva* deserved specific standing and ought not to be reduced to varietal rank as the differences with *Ph. integrifolia* are more significant. The bracteoles are inserted close to the base of the receptacle, the petals are glabrous adaxially, the filaments of the (long) stamens are entirely glabrous, and the sepals are finally nearly entirely free, whereas in *Ph. integrifolia* the bracteoles are placed at or below the middle of the pedicel, the petals pubescent adaxially on the claw and the base of the lamina, the stamens hairy in their lower part, and the sepals remain coherent in two to three lobes.

22. PHANERA INTEGRIFOLIA (Roxb.) Benth.

Phanera integrifolia (Roxb.) Benth. in Pl. Jungh. 263. 1852; Miq., Fl. Ind. bat. 1 (1): 64. 1855; *ibid.*, Suppl. Sumatra 2: 286. 1861. — *Bauhinia integrifolia* Roxburg, Hort. beng. 90. 1814, nom. nud.; Fl. ind., ed. Carey, 2: 331. 1832; Baker in Hook. f., Fl. Br. Ind. 2: 279. 1878. — *Phanera cumingiana* Benth. in Pl. Jungh. 263. 1852; Miq., Fl. Ind. bat. 1 (1): 68. 1855. — *Bauhinia cumingiana* (Benth.) F.-Vill., Novis. App. 73. 1800; Vidal, Phan. Cuming. Philipp. 110. 1885; Rev. Pl. vasc. Filip. 116. 1886; Perkins, Fragm. Pl. Philipp. 1: 9. 1904; Merr. in Philipp. J. Sci. (Bot.) 5: 44. 1910; Spec. Blancoan. 171. 1918. — *Phanera polyantha* Miq., Fl. Ind. bat. 1 (1): 1079. 1858 (= *Ph. polyantha*, Ind. kew., sphalm.). — *Bauhinia (Phanera) brachy-scyptha* Baker f. in Kew Bull. 1896: 22. — *Bauhinia (Phanera) macropoda* Baker f. in Kew Bull. 1896: 22. — *Bauhinia nymphaeifolia* Perkins, Fragm. Fl. Philipp. 1: 11. 1904; Merr. in Philipp. J. Sci. (Bot.) 5: 45. 1910; Enum. Philipp. fl. Pl. 2: 260. 1923. — *Bauhinia whitfordii* Elmer, Leaf. Philipp. Bot. 1: 229. 1907. — *Bauhinia pierrei* Gagnep. in Lec., Not. Syst. 2: 178. 1912. — *Bauhinia holovericosa* Ridley in J. As. Soc. Str. Br. 75: 182. 1917. — *Bauhinia flammifera* Ridley in J. As. Soc. Str. Br. 82: 182. 1920; Fl. Mal. Pen. 1: 631. 1922; Burkill, Diet. econ. Prod. Mal. Pen. 1: 311. 1935; Merr. in Pap. Mich. Acad. Sci. 24: 73. 1929. — *Bauhinia scandens* L. *sensu* Blanco, Fl. Filip. 332. 1837; Ed. 2, 232. 1845; Ed. 3, 2: 68. 1878. — *Phanera vahlii* Benth. *sensu* Naves in Blanco, Fl. Filip., Ed. 3, pl. 76. 1878. — *Bauhinia vahlii* Wight & Arn. *sensu* F.-Vill., Noviss. App. 72. 1880.

22a. Subsp. INTEGRIFOLIA—Fig. 18

A large climber, with circinate, flattened, pubescent tendrils; young parts rusty downy; branchlets grooved. Leaves broadly ovate to rounded, often broader than long, chartaceous to subcoriaceous, often more or less bullate, 9—11-nerved, 6—15 cm in diameter (leaves close to inflorescence very much smaller); base cordate; top nearly entire, emarginate, or with a wide, deltoid sinus and short, acute or rounded top-lobes (midrib shortly produced); lower surface at first puberulous, later glabrous, (nerves appressedly hirsute, glabrescent); petiole slender, 3—5(—7) cm long, at first densely rusty puberulous. Flowers massed in leafy panicles composed of more or less corymbose, dense, short racemes, on slender, up to about 2.5 cm long, puberulous pedicel; bracts ovate, acute, rusty pubescent; bracteoles minute. Buds ovoid. Receptacle very slender, striate, cylindrical, about 4 mm long, puberulous. Sepals coherent in 2, ovate, acute, 0.4 cm long lobes, puberulous, glabrescent. Petals obovate,



FIG. 18. *Phanera integrifolia* (Roxb.) Benth. spp. *integrifolia*.

short-clawed (claw 2—3 mm long), crisped, 11—15 mm long, densely red-rusty hirsute, yellow turning orange, finally red. Stamens 3 perfect, capillary, glabrous in the upper half; filaments about 18 mm long; anthers broadly ellipsoid, about 1.5 mm long; reduced stamens 2, one third as long. Ovary stiped, entirely densely puberulous interspersed with caducous, longer, shaggy hairs; style slender, more or less glabrous; stigma suddenly capitate or small-peltate. Pods broadly oblong, 2—3-seeded; at first puberulous; valves firm, 20—25 cm long, 7 cm broad; seeds about 6, about 3 cm across, ovate, notched, albuminous; funicle obliquely conical, with branches $\frac{2}{3}$ of the circumference of the seeds.

TYPE.—Wallich 5780 (lectotype of *Ph. integrifolia*; K).

DISTRIBUTION.—Siam, Malaysia: Malay Peninsula: Penang (West Hill; Waterfall; Penara Bukit), Perak (Ipoh; Padang Rengas), Kelantan (Sungai Terang; Sungai Lebir; Gua Ninik), Pahang (Sungai Telei; Pulau Tioman; Ulu rompin; Sungai Telom; Sungai Taban; Kuala Senok; Ulu Tembelling), Selangor (Kuala Lumpur, Ampang Res.; Kepong, Bangi Res.; Kajang; Semingih; Ulu Gombok), Negri Sembilan (Gunung Anjai For. Res.), Malacca (Baleng Malacca; Bukit Tanga; Panchur), Johore (Pulau Aor; Pulau Tinggi), Trengganu (Ulu Brang); British North Borneo; Sumatra (Surumantinggi; Ophir Distr.; Padangsidempuan, Hatiran; Pajakumbuh-agam; Huta'imbaru; Hitean Haloban; Asahan, Gurach Batu).

ECOLOGY.—Occurs in the Malay Peninsula from sealevel to 1200 m altitude, common all over the countryside; flowers orange to red, also described as "deep pink" (Henderson). Teysmann, Rahmat si Toroes, and Bannemeijer found it in Sumatra, the latter at 750 m altitude; it was very frequent and a tall bush, with red flowers in April. — Van der Pijl (MS.) noted that when two tendrils arise on opposite sides of a branch, one lacks a basal bud.

LOCAL NAMES.—Kumpaga, daup daup, dedaup (api), dedaok (Pahang); (akar) katop katop (Malacca, Pahang); akar tapak kuda (merah) seko-yah; sarau; kempaga, malimali, mesatoh (Malay Peninsula); andor si bola (Sumatra, Hatiran).

USES.—The bast fibre is very strong and used for tying (Ridley); the juice for stomach disorders (Burkill).

Ridley (1920) stated that Baker, Prain, and others had identified *Bauhinia integrifolia* Roxb. with a common lowland species of Selangor and Perak. On examining specimens in the Kew Herbarium which had Roxburgh's writing attached to them, Ridley found that *B. integrifolia* was identical with his own *B. holosericea*, occurring in the mountains. The latter name had to be discarded, Ridley concluded, and to be replaced by *B. integrifolia*; the common lowland species now appeared to be without a correct name and so a new name was given by Ridley, *B. flammifera*. Unfortunately the differences between *B. integrifolia* (*B. holosericea*) and *B. flammifera* do not hold, e.g. the supposed "long bare rhachis" in the former may just as easily be found in the latter; this depends on the age

of the inflorescence. It is, I think, necessary to maintain Roxburgh's name in the sense of Wallich, Baker, and Prain, and in accordance with the fitting description in the "Flora indica." The type material is more hairy (leaves, inflorescences) than is usually seen in the species. A similar variability in hairiness occurs in other species [*Ph. kockiana* (Korth.) Benth., *Ph. semibifida* (Roxb.) Benth., etc.] and there also caused the description of "new" species which I rejected entirely or reduced to varietal rank.

Herbarium specimens of *Ph. integrifolia* subsp. *integrifolia* are as a rule easily recognized by their numerous, crowded, small corymbs on a bare, very warty peduncle, the warts remaining after the flowers are shed.

Miquel's *Phanera polyantha* is typified by Teysmann 897HB., "Paya komba-agam," Sumatra (holotype; U), and belongs here. Even if Ridley had been justified in distinguishing between *B. integrifolia* and *B. flammifera*, the latter name ought to be rejected in view of Miquel's *Ph. polyantha* of 1858.

Bauhinia pierrei Gagnep. described for Siam is close to *Ph. integrifolia*. It is different, however, e.g. in having a glabrous ovary and style, much longer and more slender pedicels and a less warty, more slender axis of the inflorescence. It is therefore an approach to *Ph. integrifolia* subsp. *cumingiana* (Benth.) de Wit and also very close to many specimens of subspecies *integrifolia* as occurring in the north of the Malay Peninsula which have somewhat larger petals and longer-pedicelled flowers than in the southern part of the Malay Peninsula and in Sumatra. However, in subspecies *integrifolia* the stamens are always longer than the petals (and exserted); it remains for future investigation to decide whether *B. pierrei* ought to be reduced to either subspecies *cumingiana* or subspecies *integrifolia* or, possibly, may be maintained as a variety of one of them.

22b. Subsp. *cumingiana* (Benth.) de Wit, *subsp. & stat. nov.*
var. CUMINGIANA.—Fig. 19

Phanera cumingiana Benth. in Pl. Jungh. 263. 1852. — *Bauhinia* (*Phanera*) *brachyneypa* Baker f. in Kew Bull. 1896: 22. — *Bauhinia* (*Phanera*) *macropala* Baker f. in Kew Bull. 1896: 22. — *Bauhinia scandens* L. sensu Blanco. — *Phanera vahlü* Benth. sensu Naves. — *Bauhinia vahlü* Benth. sensu F. Vill.

A climber, more than 6 m tall; branchlets slender, glabrescent, grooved; tendrils flat, appressedly rusty pubescent. Leaves $\frac{1}{4}$ — $\frac{1}{2}$ bifid, subcoriaceous, broadly ovate to rotundate, often broader than long, 6—13 (—15) cm across, 11—13-nerved; base cordate; top-lobes about triangular, subacuminate, acute or, rarely, blunt; upper surface delicately reticulate.

glossy, lower surface sparsely, appressedly rusty pubescent, nerves on both surfaces appressedly pubescent, but soon glabrous on the upper side; petiole slender, appressedly puberulous, 2.5—3.5(—7) cm long; stipules rounded, very small, silky hirsute, very early caducous. Flowers numerous, crowded in simple or compound, rusty puberulous corymbs (many buds crowded in the centre), on slender, straight, up to 4.5 cm long, puberulous, apparently somewhat glandular, pedicels; bracts small, ovate-acute; bracteoles subulate often distant, in the lower half of the pedicel, in young buds more or less opposite, early caducous. Bud (limb) ovoid-sub-ellipsoid, slightly oblique, rusty puberulous, smooth. Receptacle narrowly tubular,

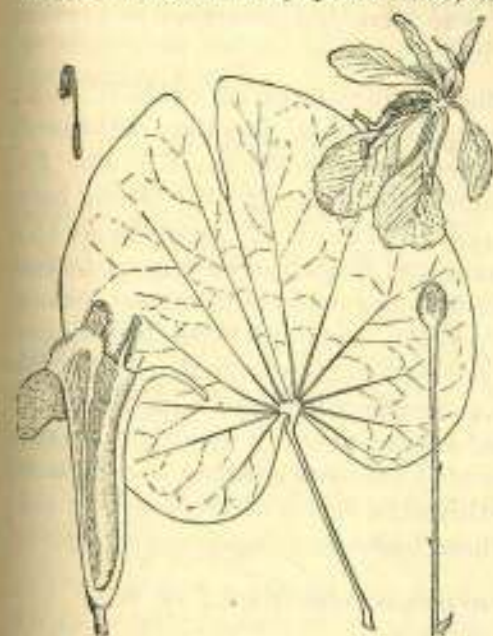


FIG. 19. *Phanera integrifolia* (Roxb.) Benth. var. *cuningiana* (Benth.) de Wit: leaf, $\frac{1}{2}$ \times ; bud, flower, and stamens, nat. size; longitudinal section through receptacle, 5 \times .

4—6 mm long, finally longer than the sepals which are coherent in 2—3 lobes and about 5 mm long. Petals very unequal, with repanding margins, externally appressedly coppery silky pilose; both the anterior with a 5—9 mm long claw, broadly obovate, 20—25 mm long (the second slightly emarginate); both the lateral ones clawed, obovate (one considerably narrower), shorter; the posterior narrowly oblong, not clawed, about 15 mm long. Stamens about 13 mm long; filaments pilose or hirsute in the lower half; anthers broadly elliptic, 3—4 mm long, early caducous. Ovary short-stiped, stipe, body and style appressedly densely silky pubescent; style slender, pubescent (in the upper part more thinly so); stigma flat-peltate. Pods flat, about 20 cm long, about 4 cm wide, thin-valved, 4—8-seeded, at first pubescent, later glabrous; seeds flat, albuminous (albumen very thin, connate to the testa), broad-bean-shaped, about 2 cm across, notched; funicle obliquely conical.

TYPE.—Cuming 1789 (holotype; *n.v.*).

DISTRIBUTION.—Malaysia: British North Borneo (near Tinkayo; Lahad Datu; Timbun mata; Port Myburgh; Simporna; Pababag Is.). Philippines: Mindoro (Paluan), Luzon (Benguet; Bontoc; Cagayan; Sorsogon; Bulacan; Rizal), Mindanao (Mt. Apo; Surigao; Agusan, Mt. Urdaneta), Cebu, Samar, Leyte, Bosoboso.

ECOLOGY.—Common in forest at low and medium altitude. Flowers cream to orange; anthers early caducous. The leaves have many very minute, pellucid dots in the areoles.

LOCAL NAMES.—Bulakan, raja barangkat, kaba-kaba (British North

Perkins suggested that *Bauhinia nymphaeifolia* was closely related to "*Phanera cumingiana*"; in my opinion it is best reduced to that species (= *Ph. integrifolia*), though it may be maintained as a variety distinguished by woolly pubescent leaves and generally somewhat more hairy petals. It was later again described by Elmer as *Bauhinia whitfordii* (Elmer 8897, holotype; A). Merrill (*l.c.*, 1910), at first doubted whether *B. nymphaeifolia* were identical with *Ph. fulva* (Bl. ex Korth.) Benth., but later (*l.c.*, 1923) he accepted it as a good species. It is certainly an approach to *Ph. fulva* but the latter is different, for instance, in having the bracteoles at the top of the pedicels, ultimately free sepals, and glabrous stamens and style.

Subsection 5. *Sessiles* de Wit, *subsect. nov.*

Subsectio foliis integris usque ad profunde bifidis in ramulis juvenilibus, etiam bifoliolatis in virgis singularibus; inflorescentiis breviter vel longè racemosis, receptaculo parvo et brevi, floribus parvis, sepalis cohaerentibus in lobis 2—3, petalis haud vel brevissime et gradatim unguatis, crenatis, antheris parvis, ovario sessili vel subsessili distincta.

Leaves entire to bifid, deeply so on young twigs, possibly in water shoots or seedlings even bifoliolate. Flowers in short or long racemes. Receptacle small and short. Buds ovoid. Sepals coherent in 2—3 lobes. Petals crisped, blade gradually narrowing into the base (claw absent or nearly so), small. Fertile stamens with about 2 mm long anthers. Ovary sessile or very nearly so.

TYPE SPECIES.—*Phanera glabrifolia* Benth.

All species known so far have rounded top-lobes to the leaf which narrow rather suddenly into a slender acumen. It seems that on young twigs or adventitious stems the leaves are exceptionally deeply split, perhaps even become bifoliolate.

This subsection consists (in Malaysia) of three species. *Phanera glabrifolia* extends over a large part of south-eastern Asia. In some respects it is an approach to subgenus *Biperina*.

KEY TO THE SPECIES OF SUBSECTION SESSILES

1. Inflorescence an elongate, 10—17 cm long raceme. Receptacle narrowly tubular. 24. *Ph. erudiantha*
1. Inflorescence a very short, broad, 3—6 cm long raceme. Receptacle turbinate.
 2. Leaf blade truncate to shallowly cordate, 7—9-nerved, soon glabrous, more or less pubescent when young. Petals inside glabrous. Receptacle 2—3 mm long. Sepals 4—5 mm long. Flowers yellow. 25. *Ph. glabrifolia*
 2. Leaf blade deeply cordate, 11—13-nerved, tardily glabrescent, silky when young. Petals inside pilose. Receptacle 1—1.5 mm long. Sepals 7 mm long. Flowers white. 23. *Ph. argentea*

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Leaves entire to bifid, deeply so on young twigs, possibly in water shoots or seedlings even bifoliolate. Flowers in short or long racemes. Receptacle small and short. Buds ovoid. Sepals coherent in 2—3 lobes. Petals crisped, blade gradually narrowing into the base (claw absent or nearly so), small. Fertile stamens with about 2 mm long anthers. Ovary sessile or very nearly so.

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 2. Leaf blade deeply cordate, 11—13-nerved, tardily glabrescent, silky when young. Petals inside pilose. Receptacle 1—1.5 mm long. Sepals 7 mm long. Flowers white. 26. *Ph. argentea*

23. *Phanera argentea* de Wit, *spec. nov.*

Species ex affinitate *Ph. glabrifoliae*, differt tamen foliis 11—13-nervatis, basi alte cordatis, tarde glabrescentibus, petalis facie interna sparse pilosis, bracteis et bracteolis brevioribus, receptaculo breviori, sepalis longioribus, floribus albis.

A shrubby climber; tendrils few; young parts silky, when dry tawny or coppery; branchlets grooved, tomentose, tardily glabrescent. Leaves roundish to ovate, $\frac{1}{2}$ bifid, often broader than long, 11—sub-13-nerved, 8—12.5 cm wide, 8—10 cm long; base deeply and broadly cordate; top lobes rounded, the tip tapering or acuminate; when young on the upper surface sparsely golden or coppery pubescent especially along the nerves, lower surface golden silky, later sparsely pubescent to more or less glabrous; petiole 3—4 cm long, rusty tomentose; stipules ovate, more or less acute, about 4 mm long, inside glabrous, externally tomentose, early caducous. Flowers in short (about 3, finally up to 7 or even 11 cm long and 4 cm wide), dense (more than half bare when lengthened), grey-brown pubescent racemes, on 1—2 cm long, angulate, pubescent pedicels; bracts linear, acute, 6 mm long, externally appressedly hirsute; bracteoles subulate, 2—3 mm long, densely pubescent, like the bracts early caducous. Buds ellipsoid, more or less oblique, sparsely pubescent. Receptacle striate, turbinate, oblique, wide, 1.5 mm long. Sepals strap-shaped, 7 mm long, reflexed, more or less free. Petals linear-oblong, gradually narrowing into the base (claw indistinct), with fleshy centre and glabrous, crenate margins, 6—9 mm long, 3 mm wide, externally long, woolly hairy, inside thinly so. Stamens 6—7 mm long; filaments glabrous; anthers about 2 mm long, oblong, staminalodes 2. Ovary sessile on a pubescent disc, entirely tomentose, 6(5)—9-ovulate; style slender, 5—6 mm long sparsely appressedly hirsute; stigma small, peltate. Pods broadly oblong, 17 cm long, 5.5 cm wide, glabrous, 3—4-seeded, seeds flat, oval, possibly exalbuminous, 23 mm across; funicle conical, 25 mm high.

TYPE.—Endert 2399 (holotype; BO).

DISTRIBUTION.—Malaysia: Borneo: Labuan, Sandakan (Kinabatangan Forest), W. Kutei; Lahad Datu, near head of East Gajah R. ("Kretam") Eastern Borneo, Bungalun.

ECOLOGY.—Endert collected the type specimen at 70 m altitude, on a low river bank; flowering in August. Petals white, at the base light green, style light green, stigma dark green, anthers red. Motley collected this species in Labuan, Hallier (915; BO) on his Borneo Expedition (1893-94) near Sanggouw, and Rutten in East Borneo (1912). In the Kinabatangan Forest it was found as a 15 feet shrub with greenish white flowers (Kadir A3570), and also as a 60 ft long climber.

LOCAL NAMES: Kulalong (Dusun-Kinabatangan), Kubalid (Malay).

24. *Phanera crudiantha* de Wit, *spec. nov.*

Species ex affinitate *Ph. rufae* Benth., speciei Indiae, tamen differt inflorescentia elongata, floribus minoribus, foliis subtus pubescentibus.

A climber; tendrils not seen, apparently early caducous; branchlets vaguely ribbed, rusty tomentose, tardily glabrescent. Leaves broadly ovate to orbicular, about $\frac{1}{2}$ bifid, chartaceous, 11—13-nerved (nerves strongly branching, midrib decidedly slender), 11—17 cm long, 10—15 cm wide; base deeply cordate; top-lobes more or less rounded, the top rather suddenly narrowly acuminate; upper surface shining, loosely and thinly pubescent when young, becoming glabrous but the pubescent nerves very tardily so, lower surface rusty pubescent, tomentose on the nerves; petiole 5—7.5 cm long, stout, at first rusty tomentose, stipules not seen, early caducous. Flowers in elongate, 10—17 cm long, rusty pubescent, laxly flowered racemes, on about 1.5 cm long, slender, woolly pubescent pedicels, the lower flowers reflexed, bracts early caducous, subulate, 2—3 mm long; rusty pubescent; bracteoles like minute, pubescent scales, near the middle of the pedicel, early caducous. Buds ovoid, vaguely apiculate, rusty tomentose. Receptacle narrowly tubular, 3—4 mm long, striate, rusty woolly pubescent. Sepals coherent in 2—3 lobes, finally reflexed, about 4 mm long, woolly pubescent. Petals obovate, narrowing into a rusty pubescent claw, 7—10 mm long and about 6 mm wide, with very much crenate margins, glabrous, externally the centre densely pubescent, inside glabrous except for the pubescent base of the blade and the claw. Stamens 6—7 mm long; filaments in the lower half hirsute, anthers ellipsoid, 1.5—2 mm long; staminodes not seen. Ovary more or less sessile on the pubescent disc, entirely rusty woolly tomentose; style short, densely pubescent, the very top glabrous and changing to the slightly broader style. Pods rusty velvety, 18 cm long, 5 cm wide, 2—3-seeded; valves firm, more or less woody; seeds compressed-oval, nearly 2.5 cm across, notched at the hilum, albuminous; funicle conical.

TYPE.—C. Boden Kloss 18739 (holotype; SING).

DISTRIBUTION.—Type collected near Bellotau (Sandakan), Borneo.

ECOLOGY.—The petals are "white with yellowish centre"; flowers in July.

This new species is closely allied to *Ph. rufa* Benth. from India. The latter differs e.g. in its glabrous leaves, corymbose inflorescences, larger flowers, and the ovary being pubescent on the margins only.

The description of the pod and seeds is based on Beccari 2765, *Piante Bornensi* (FI 3411), a specimen from Sarawak, which agrees in all particulars with the holotype of *Ph. crudiantha* but has no flowers.

Another specimen which probably belongs here, consists of leaves and some rhachises of inflorescences (Kinabatangan-besar, A. Cuadra A2130). It was collected at low altitude, a 65 m long climber, the pods of which are said to be brown velutinous, more than 30 cm long and 7—8 cm wide; vernacular name "Parang-parang."

The epithet was chosen as the inflorescence, which appears accompanied by a young leaf, and the flower, which soon loses its petals, bears a resemblance to the genus *Crydia* Schreb.

25. PHANERA GLABRIFOLIA Benth.

Phanera glabrifolia Benth in Pl. Jungh. 263. 1852, quoad nomen haud specim. cit. — *Bauhinia glabrifolia* (Benth.) Baker in Hook. f., Fl. Br. Ind. 2: 281. 1878; em. Prain in J. As. Soc. Bengal 66 (2): 193. 1897; Ridley, Fl. Mal. Pen. 1: 193. 1922. — *Bauhinia havilandii* Merr. in Philipp. J. Sci. (Bot.) 11: 79. 1916. — *Bauhinia piperifolia* Roxb. sensu Kurz in J. As. Soc. Bengal 45 (2): 288. 1873. — *Bauhinia anguina* Roxb. sensu Kurz. in J. As. Soc. Bengal 45 (2): 288. 1873. — *Phanera diptera* Miq. sensu Prain in J. As. Soc. Bengal 66 (2): 193. 1897.

A slender climber, up to 25 m long (stem 4 cm in diameter); tendrils few, short, glabrescent; branchlets grooved, grey-pubescent when young. Leaves (ob)ovate, often broader than long, entire, emarginate or bifid when on young branches (entirely split on adventitious shoots: teste Prain), subcoriaceous to chartaceous, 7—9-nerved, 7—12(—13) cm long and (5—)6—10 cm wide; base truncate to shallowly cordate or rounded; top-lobes broadly rounded to caudate-acute; both surfaces shining and delicately loosely reticulate, glabrous, lower surface sparsely hairy to glabrescent on the nerves; petiole slender, glabrescent, (1—)4—9 cm long; stipules not seen. Flowers in very numerous crowded, short, compound or simple, 3—6 cm long and equally wide, grey-brown pubescent racemes, on slender, angulate, 0.5—2.5(—3) cm long, grey-pubescent pedicels; bracts oblong, acute, 5—8 mm long, glabrous inside; bracteoles similar, in the upper half of the pedicel, narrower, about 6 mm long. Buds ovoid, grey-silky. Receptacle not conspicuous, 2—3 mm long, turbinate, grey-silky. Sepals coherent in 3 acute, grey-silky lobes, 4—5 mm long. Petals obovate, indistinctly clawed, about 6—7 mm long, margins crisped, externally densely appressely silky, but the marginal zone glabrous. Fertile stamens 6—9 mm long; filaments glabrous; anthers ellipsoid, opening by an oblong pore when in bud, on anthesis by a length-slit; reduced stamens 1—2, capillary; staminodes about 5, very short, thick, stunted. Ovary more or less sessile on the pubescent disc, woolly hirsute, sometimes laterally glabrescent, 4—6-ovulate; style slender, glabrescent or glabrous in the upper half; stigma swollen-peltate, small. Pods 3—5-seeded, broad-oblong, 17 cm long, 6—7 cm wide; seeds flat, orbicular, notched at the hilum, 2.5 cm across, exalbuminous; funicle conical, branches $\frac{1}{2}$ the circumference of the seed.

TYPE.—Kunstler 4511 (lectotype; SING).

DISTRIBUTION.—Birma (Tenasserim; Pegu). Malaysia: Malay Peninsula: Penang (Ajar Hitam, West Hill), Perak (Gopeng; Blanda Mabok); Borneo (Sarawak; Indonesian Borneo: Sungai Bruni).

ECOLOGY.—On limestone hills, at 150—300 m altitude, flowering from April to December. Kunstler noted that the flowers were "pale white with bright yellow petals; filaments white."

Prain (*op. cit.* p. 500) pointed out that Baker's delimitation should be emended and Prain's conclusions are followed here insofar as the specific limits of *Ph. glabrifolia* are concerned. Prain was mistaken about the identity of "*Bauhinia diptera*" Bl. ex Miq. (*cf.* under *Bracteolanthus*).

His view that "young leafy root-shoots" or "seedling plants" had entirely free leaflets he seems to have based on Scortechini 1512 (K, SING). I can not agree nor disprove that these leaves belong to *Ph. glabrifolia* as I see no clear difference between them and leaves of *Bracteolanthus*. If they belong to *Ph. glabrifolia*, Prain's error of confusing *Ph. glabrifolia* and "*Bauhinia diptera*" is entirely understandable as flowers of *Bracteolanthus* were discovered 20 years after he made his study. On the other hand, should they prove to belong to *Bracteolanthus*, it would mean a considerable, though by no means unlikely, extension of the area of distribution of that genus. A leaf-specimen among Beccari's plants (3416B, FI; Pianta bornensi 606) has deeply bifid leaves and not free leaflets, which may be the actual shape on young shoots of *Ph. glabrifolia*. The questions whether *Bracteolanthus* occurs in the Malay Peninsula can only be decisively answered when flowers are secured there, and whether the leaf in young adventitious shoots in *Ph. glabrifolia* is bifoliolate, only when such shoots are collected together with adult, flowering twigs from a single plant. It is to be remembered that in that case *Ph. glabrifolia* is the only species known among Malaysian species of *Phanera* in which entirely free leaflets may occur together with bilobed or entire leaves.

Bauhinia havilandii Merr. is based on specimens such as occur occasionally in Borneo and are distinct on account of the nervation of their leaves. The nerves are all equally thick, very straight, and nearly without branches. I mention Native Collector (Bur. Sci. 199, holotype of *B. havilandii*) and Jaheri (1315a, Exp. Nieuwenhuis). Though these extremes are very distinct, on examining a wider range of specimens it appears that there is not a marked and constant difference from the leaves of *Ph. glabrifolia*, which are certainly quite different in appearance in the Malay Peninsula but change gradually into the *B. havilandii* kind of leaf in Borneo.

The Bornean specimens of *Ph. glabrifolia* show a remarkable approach to subgenus *Biporina*. The anthers, when examined in bud, open by a spindle-shaped central pore; on anthesis, however, this pore lengthenens and the anther opens lengthwise as is characteristic of subgenus *Phanera*.

Subsection 6. *Corymbosae* de Wit, *subsect. nov.*

Subsectio foliis subbifoliolatis sive alte bilobatis (lobis obtusis), inflorescentiis corymbosis vel elongatis, bracteis bracteolisque longis, angustis, tarde caducis, receptaculo striato, angusto-tubulari, longo, valde longiori quam sepala, sepalis in lobis 2—3 cohaerentibus, petalis undulatis, antheris parvis tamen latioribus, ovario stipitato, glabro, seminis numero-

sis, parvis, albumine copioso, funiculo angusto, ramis funicularibus longis, distincta.

Leaves composed of two nearly free leaflets, or very deeply bilobed (lobes obtuse). Inflorescences corymbose or elongate; bracts and bracteoles long, narrow, tardily caducous. Receptacle striate, narrowly tubular, long, much longer than the sepals. Sepals in 2—3 lobes coherent. Petals wavy. Anthers small but rather broad, ovary stiped, glabrous. Seeds small, numerous, in a row centrally in the flat pods; albumen copious; funicle narrow; funicular branches longer than $\frac{1}{2}$ the circumference of the seed, often well developed.

TYPE SPECIES.—*Phanera corymbosa* (Roxb.) Benth.

This new subsection is represented in Malaysia by a single species, *Ph. glauca* Wall. ex Benth., but contains several species on the southeastern Asiatic continent, among them *Ph. corymbosa*, which is sometimes cultivated in Malaysia.

KEY TO THE SPECIES OF SUBSECTION CORYMBOSAE

1. Leaves subbifoliolate, 2—3 cm long and about 1.5 cm wide. Receptacle about 2 cm long. 26. *Ph. corymbosa*
 1. Leaves $\frac{1}{2}$ — $\frac{2}{3}$ bifid, 6—9 cm long and nearly as wide. Receptacle about 1 cm long. 27. *Ph. glauca*

26. PHANERA CORYMBOSA (Roxb.) Benth.

Phanera corymbosa (Roxb.) Benth. in Pl. Jungh. 264. 1852. — *Bauhinia corymbosa* Roxburgh (Hort. beng. 31. 1814. nomen) ex DC. Mém. XIII Lég. 487 pl. 70. 1825; Prodr. 2: 515. 1825; Roxb., Fl. ind., ed. Carey, 2: 329. 1832; Korth. in Verh. nat. Gesch., Bot. 22. 1841; Miq., Fl. Ind. bat. 1 (1): 69. 1855; ?Holt. in M.A.H.A. Mag. 7: 24. 1937; Bor & Raizada in J. Bombay nat. Hist. Soc. 42: 11 pl. 1940. — *Bauhinia scandens* L. scusa N. L. Burman, Fl. ind. 94. 1768, teste DC., i.e. quoad specim.

A straggling, slender-branched shrub, with single or paired tendrils, which are reddish strigose on one side; young shoots red-hirsute. Leaves consisting of two, nearly free, 'semicordate' leaflets (midrib produced into the sinus), membranous, both 3-nerved (and an outer marginal nerved), 2—3 cm long, 0.8—1.5 cm wide; base and top rounded; on and near nerves on lower surface sparsely, appressedly, red hirsute, especially at the base; petiole slender, 1—2 cm long, sparsely hirsute; stipules lanceolate, acute. Flowers in dense, pyramidal or conical, about 5 cm long corymbs, on slender, up to 2.5 cm long, pubescent pedicels; bracts subulate, 3 mm long, pubescent; bracteoles similar, opposite or not, tardily caducous. Buds narrowly ovoid, coppery pubescent. Receptacle striate, on anthesis much lengthening and about equalling the pedicels. Sepals coherent in 2—5, finally reflexed lobes, 6 mm long. Petals ovate-oblong, gradually nearly clawed, about 1.3 cm long, externally with some sparse hairs near the main nerve, margins crenulate, crisped. Stamens 3 perfect; filaments nearly 1 cm long, glabrous; anthers ellipsoid, 2 mm long, splitting lengthwise;

reduced stamens 5 mm long; staminodes 2, between the perfect stamens, capillary, 3 mm long. Ovary stiped, glabrous, multi-ovulate; style very short; stigma broadened, truncate. Pod linear, about 12 cm long and 1.5 cm wide, curved, smooth, glabrous, glossy; seeds more than a dozen, albuminous; funicle very narrowly conical, forking at the hilum into two branches which run along $\frac{1}{2}$ of the circumference of the seed as a flat fringe.

DISTRIBUTION.—China, Hainan. Introduced into Malaysia from various sources (e.g. Honolulu); not yet escaped from cultivation.

ECOLOGY.—At Singapore flowering in June.

USES.—Of horticultural interest. Holttum wrote: "The petals are white, faintly pink at the base, the filaments pale pink, the anthers whitish brown, the ovary pink with darker stigma, the flowers very fragrant like *Viburnum* and Honeysuckle."

In his "Flora hongkongensis," Bentham (*in* Hook. J. Bot. 4: 77. 1852) referred a specimen of *Ph. glauca* Wall. ex Benth. to this species. *Phanera corymbosa* belongs to subgenus *Phanera* but represents an extra-Malaysian section. Korthals (*in* Verh. nat. Gesch., Bot. 92. 1841) records it, in error, for Sumatra, meaning to refer to *Ph. glauca*.

27. PHANERA GLAUCA Wall. ex Benth.

Phanera glauca Wallich ex Bentham *in* Pl. Jungh. 265. 1852; Miq., Fl. Ind. bat. 1 (1): 68. 1855. — *Bauhinia viridiflora* Bl. ex Miq., Fl. Ind. bat. 1 (1): 68. 1855, *in* syn., *hanc sensu* Backer. — *Bauhinia glauca* (Benth.) Benth., Fl. hongk. 99. 1861; Baker *in* Hook. f., Fl. Br. Ind. 2: 282. Prain *in* J. As. Soc. Bengal 66 (2): 186. 1897; Gagnep. *in* Fl. gén. Indo-Chine 2: 138. 1913; Ridley, Fl. Mal. Pen. 1: 629. 1922. — *Bauhinia micrantha* Ridley *in* J. As. Soc., Str. Br. 59: 98. 1911; Fl. Mal. Pen. 1: 633. 1922.

A liana, or sometimes a climbing shrub, up to over 20 m tall; tendrils strigose; branchlets appressedly coppery (silky) pubescent, soon glabrescent; ultimate branches grooved. Leaves more or less orbicular, often broader than long, $\frac{1}{2}$ — $\frac{1}{2}$ bifid, 7—11-nerved, 6—9 cm long; base very broad, truncate to cordate, chartaceous; top-lobes rounded, sinus narrow; on the lower surface sparsely appressedly pubescent especially on the nerves; petiole slender, 2—4 cm long, appressedly thinly pubescent; stipules linear, acute, 4 mm long, outside rusty hirsute or more or less glabrous. Flowers in dense, conical, small corymbs, on slender, 1.5—2.5 cm long, (sparsely) rusty puberulous or pubescent pedicels; bracts linear, subulate, acute, 5 mm long; bracteoles similar, still narrower, near the middle of the pedicel, tardily caducous. Buds glabrous or with some pubescence at the top, ovoid. Receptacle very strongly striate, tubular, 7—11 mm long, glabrous, or sparsely fugaciously pubescent. Sepals coherent in 3 ovate, about 4 mm long, glabrous lobes. Petals broad, ovate to orbicular, wavy, 10—14 mm long including the suddenly narrower, 4 mm long claw, externally the outer ones sparsely pubescent, the inner ones nearly glabrous. Fertile stamens slightly exceeding the petals; filaments glabrous,

anthers ellipsoid, 2 mm long; reduced stamens 2, subulate, 3 mm long; 5 posterior short staminodes, connate by their much thickened bases. Ovary glabrous, 16—20-ovulate; stipe glabrous; style 2 mm long, stout; stigma small, the broadened ending of the style oblique. Pods large, 18—22 cm long and 3—5 cm wide, very flat, glossy, thin-valved, glabrous, many-seeded; seeds in the centre of the pod, much compressed, about 1 cm long, ovate; albumen large; funicular rims running $\frac{2}{3}$ of the circumference, hilum yellow.

DISTRIBUTION.—Indo-China; Lower Siam; India (Khasia Hills); Birma (Tenasserim); Hongkong; China (Kuangsi; Su-Tchuen). Malaysia: Malay Peninsula: Perlis (Chupeng), Kedah (Jeniang Road), Perak (Kampung Kota), Pahang (Pulu Tioman; Benta-Kuala Lipis), Selangor (Pretes-Bukit kutu); Sumatra (Pulu Sebesi; Sibolangit; S of Tebingtinggi; Kebondjahe to Kotatjane); Java (Djampang-kulon; Priangan; Prigi; Mt. Wilis; Sumber; Pasuruan; Besuki; Mt. Kemiri).

ECOLOGY.—A creeper on rocks (Moh. Nur), also climbing in jungles and in glades in primary forests, "bambu duri"-forest or alang-alang fields, from sealevel to 500 m in the Malay Peninsula and in Java. The petals are white or creamy, the anthers dark wine-red. After fires or chopping it repeatedly recovers by shoots from the stumps. The pods arise usually from the lower part of the inflorescence, and its old upper axis, heavily warted, persists among the stems in the bunch of pods. — Ridley observed his "*Bauhinia micrantha*" on limestone rocks and in bushes in open country; it flowered in March, flowers white (Perlis). The specimen of Sumatra's East Coast (Yates 1481) had a slight-coloured, fugacious pubescence on the upper surface of the leaves.

USES.—Sap swallowed against haemorrhagic dysentery.

Miquel (*op. cit.* p. 69) described in *Ph. glauca* a plant β , *pilosior*, which he declared to be identical with "*Ph. (Bauhinia olim) ochroleuca* Blume in Herb. L. B." I find no reason to retain this variety.

The holotype of *Bauhinia micrantha* Ridley (Ridley 15108; SING) belongs here.

Phanera glauca is closely related to *Phanera tenuiflora* (Watt ex Clarke) de Wit, *comb. nov.* (basinym, *Bauhinia tenuiflora* Watt ex Clarke in J. Linn. Soc., Lond. (Bot.) 25: 18 *pl. 6.* 1889). The former differs in having corymbose inflorescences (not elongate racemes), a shorter and glabrous receptacle (in *Ph. tenuiflora* this is about 25 mm long and densely, persistently pubescent), and shorter stamens and petals. Prain [in J. As. Soc. Bengal 66 (2): 501, 1897] found 15 to 20 seeds in the pods of *Ph. tenuiflora*.

Subgenus 2. *Biporina* de Wit, *subgen. nov.*

Folia integra vel bilobata rarissime e foliolis duobus liberis composita. Alabastra globosa vel ovoidea, plerumque apiculata. Bracteolae infra

medium vel proxime medium pedicelli positae. Sepala brevia, plus minus ovata, in lobis 2—3 cohaerentia. Antherae latae, breves, parvae; thecae per foram centrale dehiscentes.

Leaves entire or bilobed, very rarely consisting of two free leaflets. Buds globose to ovoid, usually apiculate. Bracteoles below or about the middle of the pedicel. Sepals short, more or less ovate, coherent in 2—3 lobes. Anthers broad, short, small, each theca opening by a central pore.

TYPE SPECIES.—*Phanera foraminifera* (Gagnep.) de Wit.

DISTRIBUTION.—South-eastern Asia, centred in Malaysia (Borneo and Malay Peninsula).

KEY TO THE SECTIONS OF SUBGENUS BIPORINA

1. Leaves consisting of two free or nearly free leaflets. Section 1, *Bifoliola* (p. 491)
1. Leaves entire, emarginate or bilobed.
 2. Leaves entire; top acuminate or obtuse. Nerves 3, rarely 5. Midrib and first pair of lateral (campylodromous) nerves on the lower surface very prominent, the appearance of the leaf like in *Cinnamomum*. Receptacle much exceeding the sepals, rarely more or less equally long but then the inflorescence is an elongate raceme. Section 3, *Cinnamomifolia* (p. 519)
 2. Leaves bilobed, emarginate or entire, rarely acuminate. Nerves 5—11, sometimes seemingly 3-nerved but then 2 slender, short, basal veinlets are also present. Nerves on the lower surface usually prominent, palmately arranged. Section 2, *Palmatifolia* (p. 492)

Section 1, *Bifoliola* de Wit, *sect. nov.*

Sectio foliis bifoliolatis sive sub-bifoliolatis.

Leaf consisting of two entirely or nearly free leaflets.

TYPE SPECIES.—*Phanera foraminifera* (Gagnep.) de Wit.

DISTRIBUTION.—Malaysia: Borneo.

One species known (*Phanera foraminifera*) a second is provisionally described and placed here as the specimen consists of leaves only.

KEY TO THE SPECIES OF SECTION BIFOLIOLA

1. Leaves on the lower surface pubescent, 3—5 cm long and each half about 2 cm wide. 28. *Ph. foraminifera*
1. Leaves glabrous, about 13 cm long and 5 cm wide. *Phanera* sp. nov. A

28. *Phanera foraminifera* (Gagnep.) de Wit, *comb. nov.*

Bauhinia foraminifer Gagnepain in Lec., Not. Syst. 2: 171. 1912; Merr., Enum. Born. 298. 1921.

A climbing shrub; young twigs glabrous, glossy, terete, with glabrous, short tendrils. Leaves bifoliolate; leaflets laterally attached to the petiole, sometimes very shortly connate, oblique, ovate-oblong, asymmetrical (petiole mucronate in the closed sinus), firmly chartaceous, 3(—1)-nerved (and with an uninterrupted marginal nerve), glaucous, 3—5 cm long,

1.5—2(—2.5) cm wide; base rounded; top rounded but narrower; both surfaces reticulate, lower thinly red (appressedly) pubescent (when young and on the nerves densely so); petiole 1.5—2 cm long, slender, glabrescent; stipules ovate, acute, about 1 mm long, early caducous. Flowers in lax, terminal, short, 4—6 cm long corymbs on filiform, 3—4 cm long, glabrous pedicels; bracts and bracteoles small, glabrous, very early dropping. Buds thickly globose, sharply apiculate. Receptacle slender, striate, cylindrical, 7—10 mm long, glabrous. Sepals coherent in 3 ovate, acute, 4—6 mm long lobes. Petals obovate (gradually narrowed into a sturdy, 1—2 mm long claw), more or less crenate, 1.2—1.5 cm long, externally (sparsely) appressedly hirsute. Stamens 3 perfect (shed very early); filaments about 7 mm long, glabrous; anthers very broad, broader than long, opening by a central pore; reduced stamens and staminodes 6—7, the longest nearly equalling the fertile stamens in length. Ovary glabrous, except some small hairs on and near the base of the stipe; style slender, about 3 mm long, glabrous; stigma small, peltate. Pods unknown.

TYPE.—Beccari 2365 (holotype, P).

DISTRIBUTION.—Malaysia: Borneo: Sarawak (near Kuching; Batu Anam).

ECOLOGY.—Flowering from August to October. Hewitt noted that the petals were white.

Gagnepain described the petals either from imperfect material or in bud, which may account for the discrepancies between the original publication and the present description. He seems to have been the first to have noticed the peculiar manner in which the thecae may open in *Phanera*, viz by a central pore. This character is, however, not of specific but of subgeneric value.

PHANERA SPEC. NOV. A

Leaflets free, firmly chartaceous, semi-cordate (the inner margin more or less straight, the outer deeply rounded), 3-nerved (nerves raised on both surfaces, transversal nerves many, evident and the blade sub-bullate), about 13 cm long, about 5 cm wide, entirely glabrous, glistening on both surfaces like varnished; top contracted to an about 1.5 cm long blunt acumen which curves outwards; petiole 4—5 cm long, glabrous, produced into a thick, curved, persistent, about 4 mm long mucro between the leaflets.

DISTRIBUTION.—Malaysia: Borneo, Sarawak (Kuching, Gunong Tieng).

The description was made after Clemens 20486, "a great liana in rocky forest." Although it represents an unnamed species, I have preferred not to base a new binomial on a sterile specimen.

Section 2. *Palmatifolia* de Wit, *sect. nov.*

Sectio foliis bilobatis, emarginatis vel integris, rarissime acuminatis, basi leviter sive alte cordatis vel rotundatis, numquam acutis. Nervi 5—11.

rarissime 3 cum duobus nervulis brevibus basalibus additis. Costa inter nervos crassior sive tenuior, nervi primarii laterales non paralleli per marginem sed omnes consequenter gradatim tenuiores nec costa et nervi laterales primarii abrupte crassiores quam sequentes.

Leaves bilobed, broadly ovate, often broader than long, never elliptic-oblong, emarginate or entire, very rarely acuminate; base shallowly or deeply cordate to rounded, never acute; nerves 5—11, very rarely 3 but then with 2 short, slender veinlets near the base; midrib thickest or not, the lateral nerves gradually thinner according to their distance from the midrib, the first inner lateral nerves not parallelous with the margin and not suddenly thicker than the outer lateral nerves, as a rule not delimiting a symmetrical elliptical or fusiform central section in the blade.

TYPE SPECIES.—*Phanera bidentata* (Jack) Benth.

The species of this section are generally well distinguished if closely allied. It proved to be necessary to reduce a number of taxa, formerly accepted as species allied to *Ph. bidentata*, to the rank of varieties or subspecies. The group of species consisting of *Ph. wrayi* (Prain) de Wit, *Ph. cardiophylla* (Merr.) de Wit, and *Ph. moultonii* (Merr.) de Wit may appear to require a similar treatment when in the course of time more, and more complete, material will become available.

ARTIFICIAL KEY TO THE TAXA OF SECTION PALMATIFOLIA

1. Receptacle in fully grown flowers at most 10 mm long, about equalling the sepals, usually shorter.
 2. Ovary, stipe, and disc glabrous or nearly so. Leaves entirely glabrous, entire.
 35. *Ph. mexispermacca*
 2. Ovary, stipe and disc not glabrous. Leaves rarely glabrous, sometimes entire.
 3. Leaves 9—11-nerved.
 4. Petals 2—4 cm long. Receptacle 7—8 mm long, dilated at the base. Flowers lemon-yellow. Leaf-top long, slenderly acuminate. 38. *Ph. pyrhoneura*
 4. Petals about 1 cm long. Receptacle about 4 mm long, not dilated at the base. Flowers pinkish or purplish.
 5. Buds and pedicels glabrous. Leaves bilobed.
 - 36b. *Ph. moultonii* var. *rubella*
 5. Buds and pedicels puberulous. Leaves entire or very shallowly bilobed.
 - 36a. *Ph. moultonii* var. *moultonii*
 3. Leaves 3—7-nerved.
 6. Leaves entirely glabrous.
 7. Buds and pedicels glabrous. Receptacle about 4 mm long. Bracts broadly ovate. 30. *Ph. cardiophylla*
 7. Buds and pedicels woolly pubescent. Receptacle 4—5 mm long. Bracts linear. 33e. *Ph. finlaysonianana* var. *montana*
 7. Buds and pedicels thinly appressedly pubescent. Receptacle 7—10 mm long. Bracts linear. 33d. *Ph. finlaysonianana* var. *leptopus*
 6. Leaves on the lower surface at least on the nerves puberulous or pubescent. Buds as a rule puberulous or pubescent.

8. Ovary and style glabrous, or nearly so.
9. Petals about 2.5 cm long. Pedicels 6—9 cm long. Buds large. Receptacle strongly ribbed. 37. *Ph. posthumi*
9. Petals about 1 cm long. Pedicels 3—4 cm long. Buds small. Receptacle nearly smooth.
10. Leaf-top entire, acute or rounded. Buds evenly rusty-pubescent or glabrous. Pedicels and leaf-nerves on lower surface glabrescent.
39a. *Ph. wrayi* var. *wrayi*
10. Leaf-top emarginate or bifid. Buds glabrous or very nearly so. Leaf-nerves on lower surface persistently woolly pubescent. Pedicels glabrous. 39b. *Ph. wrayi* var. *concellata*
8. Ovary and style at least on the suture pubescent.
11. Inflorescence an elongate raceme. 34. *Ph. lucida*
11. Inflorescence corymbose.
12. Filaments of fertile stamens glabrous.
13. Pedicels 1.5—2.5 cm long. Filaments of fertile stamens 4—10 mm long.
14. Ovary laterally glabrous, hairy all on the suture. Inflorescence corymbose, rusty or coppery pubescent. Flowers yellow or creamy. 33a. *Ph. finlaysoniana* var. *finlaysoniana*
14. Ovary pilose on the lower part of the suture only. Inflorescence subcorymbose, greyish or tawny pubescent. Flowers white, petals with a red centre.
33c. *Ph. finlaysoniana* var. *montana*
13. Pedicels 2.5—8 cm long. Filaments of fertile stamens 13—20 mm long.
15. Pedicels 2.5—4 cm long. Receptacle dilated at the base.
16. Petals about 1.5 cm long. Stamens about 10 mm long. Staminodes glabrous. Pedicels slender. Sepals inside glabrous. . . . 33d. *Ph. finlaysoniana* var. *leptopus*
16. Petals about 2.5 cm long. Stamens 19—20 mm long; staminodes usually pilose in upper half. Sepals inside at base glandular-puberulous
33c. *Ph. finlaysoniana* var. *javanica*
15. Pedicels 5—8 cm long. Receptacle dilated at the base or not.
17. Receptacle wide, not dilated at the base. Petals about 2.5 cm long. Bracteoles near the base of the pedicel. Reduced stamens and staminodes 3—4.
33b. *Ph. finlaysoniana* var. *amoena*
17. Receptacle narrow, dilated at the base. Petals about 1.5 cm long. Bracteoles below the middle of the pedicel. Reduced stamens and staminodes 7—10.
33d. *Ph. finlaysoniana* var. *leptopus*
12. Filaments of the fertile stamens wholly or partly hirsute (*Ph. bidentata* subsp. *bidentata*).

18. Sepals with an abruptly raised, oval centre. Leaves acute, entire, tapering from below the middle.
29b. *Ph. bidentata* var. *fraseri*
18. Sepals smooth. Leaves blunt or bifid, tapering from above the middle, often nearly orbicular.
29c. *Ph. bidentata* var. *kingii*.
1. Receptacle in fully grown flowers 13—25 mm long, far exceeding the sepals.
19. Petals densely silky hirsute externally. Ovary entirely densely hirsute or pubescent.
20. Receptacle about 13 mm long; sepals about half as long. Filaments of perfect stamens about 5 mm long; staminodes 0—2 present. Petals 8—11 mm long. Inflorescence, leaves, and branchlets rufous pubescent.
32. *Ph. decumbens*
20. Receptacle 20—25 mm long; sepals less than half as long. Filaments of perfect stamens about 3 mm long; staminodes about 4 present. Inflorescence, leaves, and branchlets red-coppery pubescent. 31. *Ph. cuprea*
19. Petals sparsely pubescent externally. Ovary laterally glabrous or very nearly so.
21. Filaments of the fertile stamens 2—3 mm long, thick, increasing towards the base. (*Ph. bidentata* subsp. *bicornuta*)
22. Filaments of the fertile stamens hairy, about 3 mm long. Leaves as a rule entire. 29e. *Ph. bidentata* var. *cornifolia*
22. Filaments of the fertile stamens glabrous, about 2 mm long. Leaves bilobed or entire. 29d. *Ph. bidentata* var. *bicornuta*
21. Filaments of the fertile stamens 4—8 mm long, slender and not increased towards the base, partly or wholly hirsute. Leaves usually entire.
(*Phanera bidentata* subsp. *bidentata*)
23. Sepals with an abruptly raised, oval centre. Leaf entire, acute, tapering from below the middle. 29b. *Ph. bidentata* var. *fraseri*
23. Sepals smooth. Leaf bilobed or entire, if acutish then tapering from above the middle. 29a. *Ph. bidentata* var. *bidentata*
23. Sepals smooth. Leaf entire, rarely shallowly split, coriaceous, more or less orbicular. Marginal nerve basally stout.
29c. *Ph. bidentata* var. *kingii*

29. PHANERA BIDENTATA (Jack) Benth.—Fig. 20

Phanera bidentata (Jack) Benth in Pl. Jungh. 263. 1852, p.p., haud Cuming 1744; Miq., Fl. Ind. bat. 1 (1): 64. 1855. — *Bauhinia bidentata* Jack, Mal. Misc. 2: 75. 1822; Hook. in Comp. Bot. Mag. 1: 223. 1835-1836; Baker in Hook. f., Fl. Br. Ind. 2: 279. 1878; Prain in J. As. Soc. Bengal 66 (2): 187, 496, 498. 1897; Burkill, Dict. econ. Prod. Mal. Pen. 1: 311. 1935. — *Bauhinia emarginata* (non Miller) Jack, Mal. Misc. 2: 75. 1822 (non Miller). — *Phanera bicornuta* Miq., Fl. Ind. bat., Suppl. Sumatra 286. 1860. — *Bauhinia cornifolia* Baker in Hook. f., Fl. Br. Ind. 2: 278. 1878. — *Bauhinia scortechinii* Prain in J. As. Soc. Bengal 66 (2): 188. 1897. — *Bauhinia kingii* Prain in J. As. Soc. Bengal 66 (2): 189. 1897. — *Bauhinia monticola* Ridley in J. As. Soc. Str. Br. 75: 28. 1917. — *Bauhinia breviflora* Ridley, Fl. Mal. Pen. 5: 306. 1925. — *Bauhinia gracilipes* Merr. in Pap. Michigan Acad. Sci. 19: 157. 1934.

29a. Subsp. BIDENTATA. var. BIDENTATA.

A large climber (when growing apart sometimes shrubby or tree-like, *teste* Prain); tendrils glabrous. Leaves ovate, entire or more or less emarginate (often mucronate, the midrib being produced) or $\frac{1}{4}$ bifid (or bidentate), firmly chartaceous, 5–7-nerved, 5–8(–10) cm long and 4.5–6.5(–7) cm wide; base rounded, truncate or shallowly cordate; top acute, top-lobes (if any) acute, more or less falcate; lower surface finely appressedly rusty puberulous or pubescent, often dull glaucescent; petioles

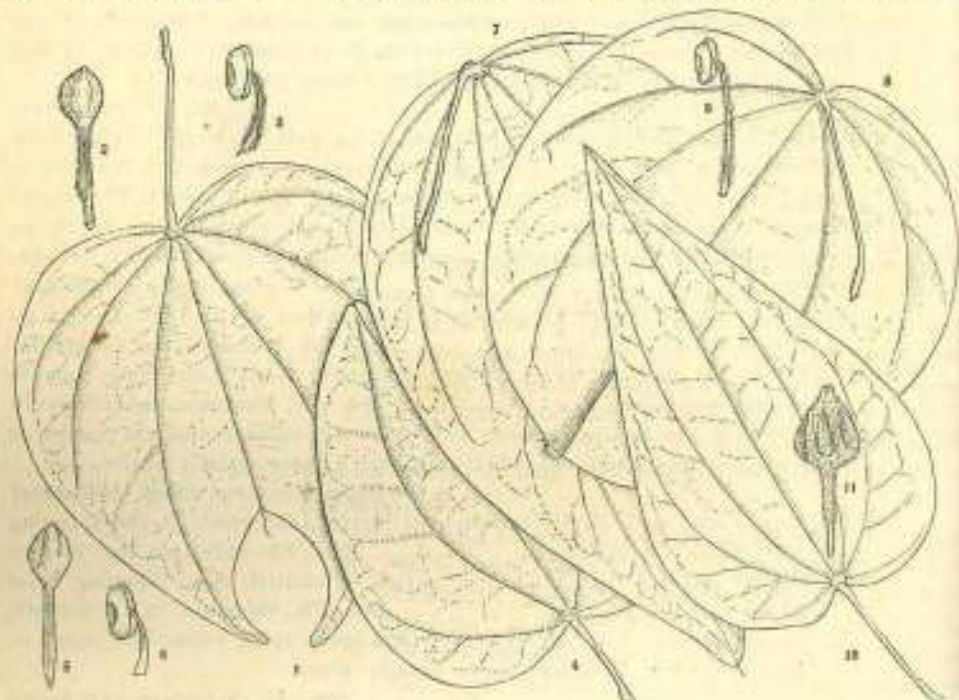


FIG. 20. *Phayera bidentata* (Jack) Benth. var. *bidentata*: 1, leaf; 2, bud; 3, stamen. — var. *bicornuta* (Miq.) de Wit: 4, leaf; 5, bud; 6, stamen. — var. *cornifolia* (Baker) de Wit: 7, leaf. — var. *kingii* (Stapf) de Wit: 8, leaf; 9, stamen. — var. *frazeri* de Wit: 10, leaf; 11, bud. — All leaves $\frac{1}{2}$ \times , all floral parts $2\frac{1}{2}$ \times .

slender, 1–3 cm long; stipules broad-falcate to auriculate, 0.4 cm long, almost glabrous. Flowers in dense, about 10 cm long, rusty or red brown puberulous racemes or corymbs, on up to 5 cm long, slender, puberulous pedicels; bracts and bracteoles linear. Buds ovoid, apiculate. Receptacle striate, cylindrical, 13–20 mm long, puberulous. Sepals coherent in 3–4 ovate, acute, 6 mm long lobes. Petals obovate, not or shortly clawed, 14–22 mm long, externally sparsely pubescent, yellow to orange, at length brightly scarlet. Stamens 3 perfect; filaments 4–8 mm long, slender, wholly or partly short-hirsute, early caducous; anthers thick, ellipsoid, opening with a central pore in each theca; reduced stamens 5. Ovary in

the centre glabrous or entirely appressedly hirsute, about 6-ovulate; stipe 2—4 mm long, slender, hirsute; style short hirsute or not; stigma peltate. Pod oblong, thinly woody, up to 10 cm long, glabrous, glossy, seed 4—5, flat, 1 cm across; funicle conical, the slender upper branch running along the edge of the seed for more than $\frac{1}{2}$ its circumference.

TYPE.—Wallich *c.s.*, *s.n.*, 1822 from Penang (?neo-) holotype; C).

DISTRIBUTION.—Malaysia: Malay Peninsula: Wellesley I., Penang (Government Hill), Perak (G. Keledang; G. Kerbau; Bujong Malacca), Pahang (Cameron Highlands, Fraser Hill), Selangor (Kanching Forest Res.), Negri Sembilan (Bukit Tongga).

ECOLOGY.—In forests from 900 to 1500 m altitude; the at first orange flowers turn a brilliant red. As a climber it may attain a length of 45 m. Flowers appear especially in November to January and May to August.

USES.—Burkill (*l.c.*) notes that its long, flexible, very durable stems are used for tying fences. Also as a medicine.

LOCAL NAMES.—Akar katup-katup, dedaok, sekoyah, dauh nasi (Mal. Pen.), pride of Selangor (English).

A number of specimens might be believed to be Jack's type, assuming that it escaped the fire of the "Fame" in 1823 or reached England at an earlier date. In the Delessert Herbarium are two specimens collected on Penang (1822) by N. Wallich (or his helpers); these were numbered 5778 and 5778a in the Catalogue. Another specimen, from the same locality and unnumbered is in the Copenhagen Herbarium. I think that the latter should be appointed as the type as it answers Jack's description in all particulars. Both specimens in the Delessert Herbarium are *Ph. bidentata* subsp. *bidentata*, though less characteristic.

Bentham appointed Cuming 1744 as the type of *Bauhinia bidentata* Jack but this choice is to be rejected.

29b. Subsp. BIDENTATA var. *fraseri* de Wit, var. *nov.*

Varietas foliis infra glaucis, normaliter sparse ferrugineo hirsutis, apice acutis (mucronatis) ab tertia parte basali cuneatis; inflorescentia cupreo hirsuta, bracteis bracteolisque magnis, comparate longis, persistentibus; lobi calycis alabastris in medio conspicue elevati.

Leaves ovate, acute, entire, 7-nerved (nerves strongly branching); upper surface glossy, lower glaucescent, usually thinly appressedly coppery hirsute especially on the nerves; petiole slender, woolly pubescent. Flowers in corymbs (centre depressed), on slender, coppery shaggy-pubescent, 3—4 cm long pedicels; bracts linear-acute, narrowly ovate, acute, about 9 mm long; coppery pubescent; bracteoles linear-acute and as long as the bracts, coppery pubescent, in the lower half of the pedicels, tardily caducous. Buds ovoid, more or less apiculate, silky, coppery pubescent especially in the grooves between the raised centres on the sepals. Receptacle narrowly tubular, striate, 7 mm long, woolly pubescent. Petals broadly ovate, with broadly rounded top, about 2 cm long, short-clawed

(margins crenulate), externally thinly appressedly silky-pubescent. Stamens 4 mm long; filaments appressedly pubescent; anthers about 1.5 mm long; staminodes few, minute. Ovary on a silky, coppery pubescent stipe, densely pubescent on the suture, sometimes glabrous laterally; style slender, glabrescent in the upper part; stigma peltate, swollen.

TYPE.—Corner S.F.33198 (holotype; SING).

DISTRIBUTION.—Malaysia: Malay Peninsula: Perak (Bujong Malacca, on the top), Pahang (Fraser Hill; also Tanah Rata, Cameron Highlands).

ECOLOGY.—The type was collected at 1200 m altitude, other specimens at 1500 m; flowers in August to September. A beautiful plant, going to the tops of tall trees (Burkill and Holttum 8586).

This new variety was repeatedly collected on Fraser Hill and seems to be restricted to a small area. It is easily distinguished from allied taxa by the peculiar relief on the sepals. The inflorescences are always woolly pubescent or hirsute and the leaves entire and acute, tapering from far below the middle.

A most interesting specimen was collected by C. W. Franck on Fraser Hill (1406, Herb. Copenhagen). In all its characters it is conform variety *fraseri*, only it is very much larger in all its parts. I noted: tendrils about 10 cm long, petioles 4.5 cm long, petals 4 cm long, 3 cm wide, stamens 6 mm long, style 2 cm long. It would seem highly desirable to have some genetic data concerning this beautiful plant which suggests to be a "gigas" relation of normal variety *fraseri*.

29c. Subsp. *BIDENTATA* var. *kingii* (Prain) de Wit, var. & stat. nov.

Bauhinia kingii Prain in J. As. Soc. Beng. 66 (2): 189. 1897. — *Bauhinia monticola* Ridley in J. As. Soc. Str. Br. 75: 28. 1917.

A slender climber. Leaves very variable, usually cordate, often very broad, 8—10 cm long and 6—8 cm wide, coriaceous, sparsely appressedly pubescent on the glaucescent lower surface, 5—7-nerved; top bifid (lobes narrow), emarginate or entire; nerves much branching, marginal nerve stout near the base; petiole slender, 2—3 cm long; stipules oblong, rounded, about 4 mm long, externally appressedly puberulous. Flowers on 3—6 cm long, slender, angulate pedicels; bracts lanceolate, about 5 mm long, early caducous, like the bracteoles which are about 2.5 mm long and subulate. Buds subglobose, apiculate. Receptacle 5—9, sometimes up to 15 mm long, rather wide, not dilated at the base, strongly striate, coppery silky pubescent. Sepals about 7 mm long, coherent in 2—3 lobes, silky pubescent.

Petals 2—2.5 cm long, (ob)ovate, rounded, very shortly clawed or sessile, sparsely appressedly pubescent externally. Stamens up to about 7 mm long; filaments hirsute. Ovary entirely red-rusty puberulous or pubescent only along the suture, on the stipe, and on the slender style;

stigma peltate. Pods small, about 5 cm long, 1 cm wide, quite glabrous, woody, narrowly ovate; seeds 1—2, ovate, compressed.

TYPE.—Scortechini 320 (lectotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Pahang (Cameron Highlands, Kluang Terbang; Gunong Tahan, Wray's Camp; Rhododendron Hill); Selangor (Gunong Menkuang).

ECOLOGY.—Occurring at 1000—1600 m altitude. Flowers "bright-red" or "deep pink" (August).

Prain stated that his *Bauhinia kingii* was "exceedingly distinct." I have been unable to distinguish it from *B. bidentata*. In Prain's key to the species of *Bauhinia* [in *J. As. Soc. Bengal* 66 (2): 177. 1897], *B. kingii* is set apart on the strength of its "calyx-tube not exceeding the limb" but I found in Prain's paratypes several flowers in which the tube was nearly twice as long as the limb. Holttum 20605 (Wray's Camp) is an illustrative specimen.

The holotype of *Bauhinia monticola* Ridley (H. C. Robinson, s.n., January 1913, Selangor, Gunong Menkuang; SING) belongs here.

29d. Subsp. *bicornuta* (Miq.) de Wit, *subsp. & stat. nov.*

Var. BICORNUTA.

Phanera bicornuta Miquel, *Fl. Ind. bat., Suppl. Sumatra* 286. 1860. — *Bauhinia emarginata* Jack, *Mal. Misc.* 2: 75. 1822 (non Miller). — *Bauhinia gracilipes* Merr. in *Pap. Michigan Acad. Sci.* 19: 157. 1934.

A sometimes scrambling climber; branchlets terete, glabrous, the young tops rusty downy, with often numerous tendrils. Leaves rounded to broadly ovate, nearly entire to $\frac{1}{2}$ bifid, 7—9-nerved, (firmly) subcoriaceous; 8—11 cm in diameter; not quite glabrous (here and there irregularly minutely, sparsely puberulous) between the strongly elevated, conspicuously branching, pubescent nerves on the lower more or less glabrous surface, both surfaces finely reticulate; base broadly (shallowly) cordate; top-lobes very small and rounded to more or less deltoid; petiole 3.5—5.5 cm long; stipules not seen. Flowers in numerous, lateral and terminal, up to 10(—17) cm long racemes; pedicels 4—6(—9) cm long, slender, angulate, puberulous; bracts ovate, more or less acute, 2—3 mm long, glabrous but ciliate, tardily caducous; bracteoles similar but narrower, placed far below the middle of the pedicels. Buds (limb) ovoid, acute, fugaciously puberulous. Receptacle very slender, striate, 13—22 mm long, gradually merging into the pedicel. Sepals more or less coherent in 4—5 ovate, acute, 6—7 mm long lobes. Petals about equal, obovate, gradually narrowed into the base, sparsely appressedly hirsute externally, yellow, pink, or bright red, 1.5—2.5 cm long. Stamens 3 fertile, very short; filaments glabrous, thick, 2 mm long, anthers small, very broad; 5 smaller reduced stamens. Ovary stiped, usually silky on stipe, suture, and a rim along the produced style; stigma comparatively large, peltate. Pods oblong,

10—20 cm long, 3—5 cm broad, smooth, glossy, glabrous; seeds compressed-orbicular, notched at the hilum; albumen copious; funicle long triangular, one funicular branch encircling more than $\frac{1}{2}$ the seed.

TYPE.—Teysmann s.n., 878HB (holotype; U).

DISTRIBUTION.—Malaysia. Malay Peninsula: Penang (Government Hill, Waterfall), Perak (Larut); Kelantan (Kuala Kiai); Pahang (Cameron Highlands); Johore (Scudai R.; Palai dua atas, Kluang). Sumatra (Atchin; Wassenaar; West Coast: Suru mentingi; East Coast: Prapat Aek Sordang, Lundut Concession, Kualu).

ECOLOGY.—In lowland forests or on low hills, occurring to 1200 m altitudes in jungles, on clay or (sandy) loam soils. Flowering more or less throughout the year. The stamens are early caducous. The midrib of the leaf is the stoutest.

LOCAL NAMES.—Akar kepong (Selangor), tudong periuk (Pahang).

The holotype was collected at Surumantingi (Sumatra, West Coast) but consists of a pod and leaves only.

Jack's type of *Bauhinia emarginata* was untraceable and may be believed lost in the fire of the "Fame" (1823). The description agrees in all particulars with *Phanera bidentata* subsp. *bicornuta*; Miller used the name *Bauhinia emarginata* long before Jack for a Mexican species.

Baker identified Wall. Cat. No. 5779/a as *B. emarginata* Jack. I agree with Prain that *B. emarginata* is not identical with Wall. Cat. 5779/a though Jack's description is too general to allow a certain identification. Wall. Cat. 5779/a, however, is the neotype of *Ph. lucida* Wall. ex Benth. (see p. 511). Wall. Cat. 5792 was distributed as *B. emarginata* Jack but is an Indian species possibly best named *Phanera retusa* (Ham.) Benth. (cf. Baker in Hook. f., Fl. Br. Ind. 2: 279. 1878). *Phanera bidentata* subsp. *bicornuta* is the only taxon in the *Ph. bidentata* complex extending into Sumatra. It is different by its roundish, peculiarly lobed leaves which are never quite entire, and hairy and slightly shorter fertile stamens; the petals are not clawed, the stigma is larger.

Bartlett 7600 (A), the holotype of *Bauhinia gracilipes*, belongs here.

29e. Subsp. BICORNUTA var. *cornifolia* (Baker) de Wit, var. & stat. nov.

Bauhinia cornifolia Baker in Hook. f., Fl. Br. Ind. 2: 278. 1878; Burkill, Dict. econ. Prod. Mal. Pen. 1: 311. 1935. — *Bauhinia breviflora* Ridley, Pl. Mal. Pen. 5: 306. 1925.

Brachlets grooved, rusty puberulous. Leaves ovate, entire or shortly emarginate, (5—)7-nerved (nerves strongly branching), 6—10.5 cm long and 4.5—6.5 cm broad; base rotundate, truncate or shallowly cordate; top acute, bluntish or with small, blunt lobes; on the lower surface sparsely appressed, rusty pubescent, denser so on the nerves; petiole sturdy, about 2.5 cm long, glabrescent; stipules early caducous. Flowers in rusty pu-

berulous corymbs, on slender, about 3 cm long, puberulous pedicels; bracts narrowly ovate, acute, 5 mm long, glabrous except on the margins; bracteoles linear, acute, 3 mm long, in the lower half of the pedicels. Buds more or less globular, apiculate, rusty puberulous. Receptacle 12—16 mm long, narrowly tubular, not dilated at the base, striate, appressedly puberulous. Petals ovate, short-clawed, 1—2 cm long, crenate, externally appressedly sparsely pubescent. Stamens 3 mm long; filaments thickened towards the base, sparsely or densely pubescent; reduced stamens and staminodes about 4, up to half as long. Ovary coppery pubescent on the long (2—4 mm), slender stipe and (the lower part of) the margins; style glabrescent; stigma peltate.

TYPE.—Griffith *s.n.*, Penang (holotype; K).

DISTRIBUTION.—Nicobar Is. Malaysia: Malay Peninsula: Penang (Government Hill); Kedah-Perak Boundary (Gunong Bintang); Perak (Tapak), Sungai Siput; Pahang (Raub); Selangor (Ulu Gombak, Pataling; Kerling); Semiyih; Negri Sembilan (Sungai Njong).

ECOLOGY.—Common in lowland forests throughout the Peninsula, sometimes up to 1050 m altitude and so penetrating into the territory of subspecies *bidentata* which begins at about 900 m. Flowers often somewhat larger than in subspecies *bidentata*, yellow, turning clear orange to brick red or purplish, appearing in January to April. According to Prain, the pods are externally finely rusty-pubescent.

LOCAL NAMES.—Akar jambul merak, dedaok (Mal. Pen.).

USES.—A welcome garden plant; but as it is exceedingly hard to propagate asexually, it is rare in cultivation (Burkill).

A specimen from the Nicobars (Rinck, *Galathea Exp.*, *s.n.*, C) had the receptacle more than 25 mm long. The type of *Bauhinia brevifolia* Ridley (Burkill 16867; K) belongs here.

30. *Phanera cardiophylla* (Merr.) de Wit, *comb. nov.*—Fig. 21

Bauhinia cardiophylla Merrill in Philip. J. Sci. (Bot.) 11: 79. 1916.

A glabrous climber; the youngest leaves with few, long, fugacious hairs; tendrils slender, glabrous; branchlets glabrous. Leaves (broadly) ovate, entire (tip rarely more or less emarginate), subcoriaceous, 5—7-nerved (middle nerve stoutest), about 7 cm long; base deeply cordate; top obtuse or obtusely acuminate; both surfaces and nerves entirely glabrous, lower, glaucous; petiole slender, 1—2 cm long, glabrous; stipules obliquely obovate-falcate, about 5 mm long, shaggy hairy on edge, very early caducous. Flowers in terminal (or pseudo-lateral) short, glabrous, warty racemes, on slender, 3—4 cm long, glabrous pedicels; bracts broadly ovate, often broader than long, more or less acute, about 1 mm long, glabrous but pilose on edge; bracteoles similar but smaller; intrabracteal trichomes strongly developed. Buds (limb) spherical, abruptly apiculate, 5-grooved, glabrous. Receptacle 4 mm long, tubular, vaguely striate, glabrous. Sepals

more or less reflexed, oblong-ovate, more or less acute, about 4.5 mm long. Petals oblong-obovate, crenate, about 13 mm long and 2—3 mm wide, shortly clawed, sparsely pubescent externally and with a few short hairs internally. Stamens 3 perfect; filaments about 5 mm long, glabrous; anthers short, broader than long, connective very broad, the thecae opening by a central pore; reduced stamens 2, staminodes 3, both slightly shorter than the perfect stamens. Ovary 4-ovulate; glabrous (the stipe and margin of the receptacle hirsute); style glabrous; stigma distinct, capitate, comparatively large.

TYPE.—Native collector 1858 (holotype; *n.v.*).

DISTRIBUTION.—Malaysia: Malay Peninsula: Selangor (Gingting Simpoh, Ulu Selangor), Pahang (Bentong), Johore (Mt. George, Gunong Pulau); Borneo: Sarawak (Kuching, Baram District), British North Borneo (Mt. Bungal); West Borneo (Mt. Hjang).

ECOL.—Flowering throughout the year. Flowers white to pink or flesh-coloured. At low altitudes, on hill slopes. A specimen collected by E. Langlassé (G) on "Mont Lyang — Philippines" is erroneously localized. It is from Mount Hjang in West Borneo.



FIG. 21. *Phanera cardiophylla* (Merr.) de Wit: leaf, nat. size, flower, $1\frac{1}{2} \times$, ovary, bud, and stipule, $2\frac{1}{2} \times$.

Prain [in *J. As. Soc. Bengal* 66 (2): 191, 497, 1897] when discussing *Bauhinia wrayi*, noted that a Bornean species (later described and named as *B. cardiophylla* by Merrill) was extremely closely allied. He believed it might represent *B. cordifolia* Roxb. This cannot be proved or disproved, as Roxburgh's description is too scant to allow identification. As Roxburgh stated that his *B. cordifolia* was native of the Moluccas, I referred it to *B. lingua* DC., a common and wide-spread Moluccan species which agrees also entirely with Roxburgh's descriptive data.

Phanera cardiophylla is found in the Malay Peninsula, Sumatra, and Borneo, and is very close to what was described as *Bauhinia wrayi*. It is sufficiently distinguished, however, by its entirely glabrous, cordate leaves, shorter inflorescences, which are entirely glabrous as are the buds, and different bracts.

31. *Phanera cuprea* (Ridley) de Wit, *comb. nov.*—Fig. 22

Bauhinia cuprea Ridley in J. Str. Br. R. As. Soc. 61: 2, 1912; Fl. Mal. Pen. 1: 630, 1922.

A climber with slender circinate pubescent tendrils; branchlets cupreous tomentose, glabrescent. Leaves broadly ovate, coriaceous, 7-nerved (one additional pair, slender, basal nerves), 6–10 cm long, 4–8 cm wide; base rounded to shallowly cordate; top bifid or entire, the lobes deltoid, 0.5–2 cm long; lower surface closely appressedly coppery silky; petiole slender, up to 4 cm long, glabrescent; stipules obliquely obovate, 5 mm



FIG. 22. *Phanera cuprea* (Ridl.) de Wit: twig; anther; flower; stipule.

long, puberulous on both surfaces. Flowers in lateral or terminal, simple or compound, about 7 cm long, red puberulous corymbs with depressed centre, on up to 6 cm long slender puberulous pedicels; bracts and bracteoles very early shed. Buds nearly spherical, pointed, pubescent. Receptacle cylindrical, indistinctly striate, 2–2.5 cm long, limb splitting into 2–3, about 8 mm long, ovate, acute lobes. Petals elliptic ovate, clawed (claw 2 mm long); blade about 2–2.5 cm long, crisped, red appressedly coppery pubescent on the outer surface. Stamens 3 perfect; filaments about 3 mm long, coppery pubescent; anthers ellipsoid, about 2 mm long, with a central pore; reduced stamens and staminodes about 4. Ovary on an about 2 mm long stipe, entirely pubescent including stipe and the about 5 mm long style; stigma large, peltate.

TYPE.—Ridley 9670 (lectotype; SING).

DISTRIBUTION.—Malaysia: Malay Peninsula: Perak (Gunong Kelang).

ECOLOGY.—Ridley collected the type on an open hill top in October 1898; its flowers were red. The material I have examined was insufficient to establish whether the ultimate length of the filaments is 3 mm or more.

32. *Phanera decumbens* (Hend.) de Wit, *comb. nov.*—Fig. 23

Bauhinia decumbens Henderson in Gdn's Bull., Str. Settl. 7 (2): 1933.

A low scrambling shrub with many flattened puberulous tendrils; young branchlets ribbed, rufous pubescent. Leaves broadly ovate or or-

bicular, bifid about $\frac{1}{2}$ downwards, the midrib produced into the deltoid sinus, coriaceous, 11-nerved (nerves strongly branched and running into the margin) not included the marginal nerve, 4.5—7 cm across; base deeply cordate (lobes broadly rounded); top-lobes acute to subacuminate; upper surface delicately reticulate, lower densely red-coppery pubescent; petiole sturdy, 1.5—3 cm long; puberulous; stipules ovate-acute, 2—3 mm long, densely pubescent. Flowers in very dense, about 4 cm long corymbs (centre arrested), on 2—3.5 cm long, slender, rufous puberulous pedicels; bracts linear, densely pubescent, 2 mm long; bract-oles minute, above the middle of the pedicel, up to close to or at the base of the calyx tube. Buds globular, smooth, minutely acutely tipped, pubescent. Receptacle slender, indistinctly striate, tubular, about 1.3 cm long, red-pubescent. Sepals coherent in 2—3 ovate, acute lobes. Petals rounded to broadly ovate, slightly over 1 cm long, the upper petal smallest (lamina 6 mm), distinctly clawed (claw about 3 mm long, coppery pilose), crisped, externally appressedly densely silky. Stamens 3 (2) perfect; filaments about 0.5 cm long, red-shaggy; anthers ellipsoid, thick, large, 2 mm long, opening by a large oblong pore; staminodes 2 or 1 or absent (filaments hirsute). Ovary (and stipe) coppery silky, as is the short style, 2—4-ovulate; stigma peltate.

TYPE.—M. R. Henderson, Sing. Field No. 22268 (holotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Pahang (Gunong Senyum).

ECOLOGY.—Only one specimen is known, collected by M. R. Henderson "on open top of limestone hill, scrambling over rocks" at 480 m altitude. It flowered in July. Henderson observed that the petiole at the insertion in the blade was glandular. The petals, in life, were bullate, the "sunk veins conspicuous . . . , less so in dried specimens The shining deep coppery-red indumentum on the backs of the leaves and petals is very striking." Flowers yellow to red.

It is allied to *Ph. cuprea* (Ridley) de Wit. The indumentum becomes paler with age, the edge of the leaf is white hairy.



FIG. 23. *Phanera decumbens* (Henderson) de Wit: leaf, flower, and bud, all $\frac{3}{4}$ x.

33. *PRANERA FINLAYSONIANA* Grah. ex Benth.—Fig. 24-26

Pranera finlaysoniana Graham ex Benth. in Pl. Jungh. 262. Miq., Fl. Ind. bat. 1 (1): 62. 1855. — *Bauhinia finlaysoniana* Benth. in Pl. Jungh. 262. 1852; Baker in Hook. f., Fl. Br. Ind. 2: 278. 1878; Prain in J. As. Soc. Bengal 66 (2): 190. 1897; Ridley, Fl. Mal. Pen. 1: 632. 1922. — *Bauhinia bidentata* (non Jack) F. Vill., Nov. App. 72. 1880; Vidal, Phan. Cum. Philipp. 110. 1885; Rev. Pl. Vasc. Philipp. 117. 1886. — *Bauhinia leptopus* Perkins, Frag. Fl. Philipp. 1: 10. 1904; Merr. in Philipp. J. Sci. (Bot.) 5: 44. 1910; Enum. Philipp. fl. Pl. 2: 259. 1923. — *Bauhinia copelandii* Merr. in Philipp. J. Sci. (Bot.) 3: 230. 1908. — *Bauhinia ternatensis* Gagnep. in Lec., Not. Syst. 2: 180. 1912. — *Bauhinia hosei* Merr. in Philipp. J. Sci. (Bot.) 11: 80. 1916. — *Bauhinia leptopus* f. *javaniica* Backer, Bekn. Fl. Java, Nooduitg., 5 (Fam. 118) 23. 1941; in Blumea 5: 509. 1945.

33a. Var. *FINLAYSONIANA*.

A large climber, with few, at first slender, tendrils; branchlets soon glabrous. Leaves ovate-oblong, entire, coriaceous, prominently 3-nerved (and with 1 pair of slender, inconspicuous, outer nerves), 7—13 cm long and 3—5 cm wide; base shallowly cordate, truncate, or rounded; top curving, acuminate (acumen more or less emarginate); lower surface finally glabrous; petiole 0.5—1, in the East up to 3 cm long, appressedly pubescent, often the basal and apical joint not or hardly separated; stipules not seen. Flowers in up to 10 cm long and about 8 cm wide, densely rusty pubescent corymbs, on up to about 2.5 cm long pedicels; bracts and bracteoles small, lanceolate, the latter on about the middle of the pedicel. Buds more or less globose, apiculate, silky-coppery pubescent. Receptacle infundibuliform, 5—8 mm long, striate. Sepals about 7 mm long, coherent in 3—5 narrowly ovate, pointed lobes, inside glabrous or very nearly so. Petals more or less orbicular, distinctly and abruptly clawed (claw up to 4 mm long); blade 1.5 cm in diam., subequal, crisped, rusty pubescent externally. Stamens 5—6(—8) mm long; filaments thick, recurved; glabrous; anthers broadly ellipsoid; staminodes 7—10, glabrous. Ovary laterally glabrous, hirsute along the sutures and the stipe, on the basal part sometimes sparsely hirsute; style curved, slightly over 0.5 cm long; stigma peltate. Pod (*teste* Prain) linear-oblong, woody; seeds 4—6.

TYPE.—Graham, Wall. Cat. 5801 (holotype; K).

DISTRIBUTION.—Probably in Siam. Malaysia: Malay Peninsula: Penang (foot of Government Hill), Perak (Larut); British North Borneo.

ECOLOGY.—An uncommon variety occurring in forests between 100 and 300 m altitude. Kunstler described the flower as "nearly cream colour," the leaves as "very glossy light green."

It is peculiar that Craib (Fl. siam. Enum. 1: 520. 1928) seems to know this species from literature only as he has no new records from Siam and I suspect that its presence in Siam has been overlooked.

33b. Var. *amoena* de Wit, var. nov.—Fig. 24

Ex affinitate *Ph. kockianae* (Korth.) Benth. Satis tamen differt foliis quinque vel subseptem nerviis, inflorescentiis maioribus, laxioribus, bre-

viribusque, et characteribus florum imprimis receptaculo latiore, aequilongo vel brevioris quam sepala.

A liana; tendrils finally woody; branchlets appressedly red puberulous, furrowed. Leaves broad-ovate, 5—sub-7-nerved, subcoriaceous, 8—11 cm long, 6—8.5 cm wide; base shallowly cordate; top subacuminate; both surfaces half dull, lower, at first sparsely pubescent, later glabrous except on the nerves; petiole with incrassate base and top, 1—2.5 cm long, glabrescent; stipules obliquely obovate, 6 mm long, red-pubescent outside. Flowers in large corymbs, on 5.5—6.5 cm long, striate pedicels; bracteoles in the lower fifth of the pedicel. Buds (upper part) ovoid, more or less acuminate, shallowly grooved, red-silky pubescent. Sepals coherent in 2—3 lobes, in anthesis usually just exceeding the receptacle, about 1 cm long. Receptacle slightly curved, striate, comparatively wide, sometimes dilated at the base. Petals broadly obovate, crenate, about 2.5 cm long, appressedly rusty pubescent outside, the claw about 2 mm. Stamens about 13 mm long; filaments slender, glabrous; anthers broad-ellipsoid, 2 mm long; reduced stamens 3—4, about 7 mm long. Ovary on the stipe and along the suture shaggy rusty pubescent; style slender, about 5 mm long, nearly glabrous; stigma peltate. Pods thin-valved, 13 cm long and 3 cm wide, smooth, glabrous, 2—5-seeded.

TYPE.—Hallier 550 (holotype; BO).

DISTRIBUTION.—Malaysia: Sarawak; British North Borneo (Kinabakti); Indonesian Borneo (Mt. Damus); Sumatra.

This attractive variety was collected by Hallier on the 1893/94 Borneo Expedition, by Jaheri (Exp. Nieuwenhuis 1077) and by Carr (Kinabakti stream, Singapore Field No. 26832). It is related to *Ph. kockiana* (Korth.) Benth. but sufficiently distinct by its 5—sub-7-nerved leaves, larger and comparatively laxer and shorter inflorescences, and the characters of the flower, in particular the receptacle being wider, and shorter or equally long as the sepals. The connective is minutely apiculate.

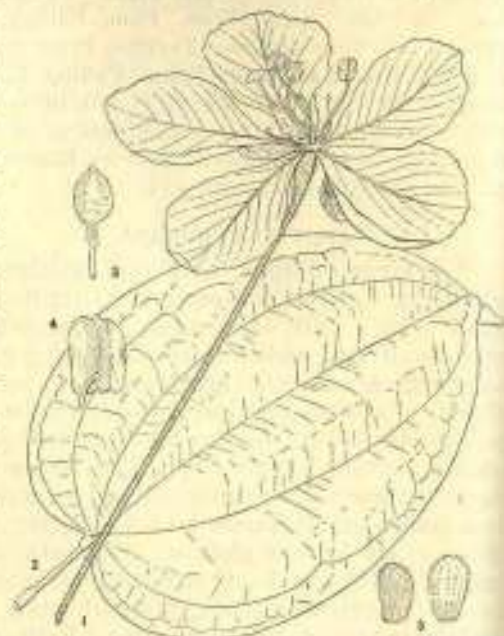


FIG. 24. *Phanera flaysoniana* var. *amoena* de Wit: 1, flower, nat. size; 2, leaf, $\frac{1}{2}$ \times ; 3, bud, nat. size; 4, anther, 5 \times ; 5, stipules, 2 \times .

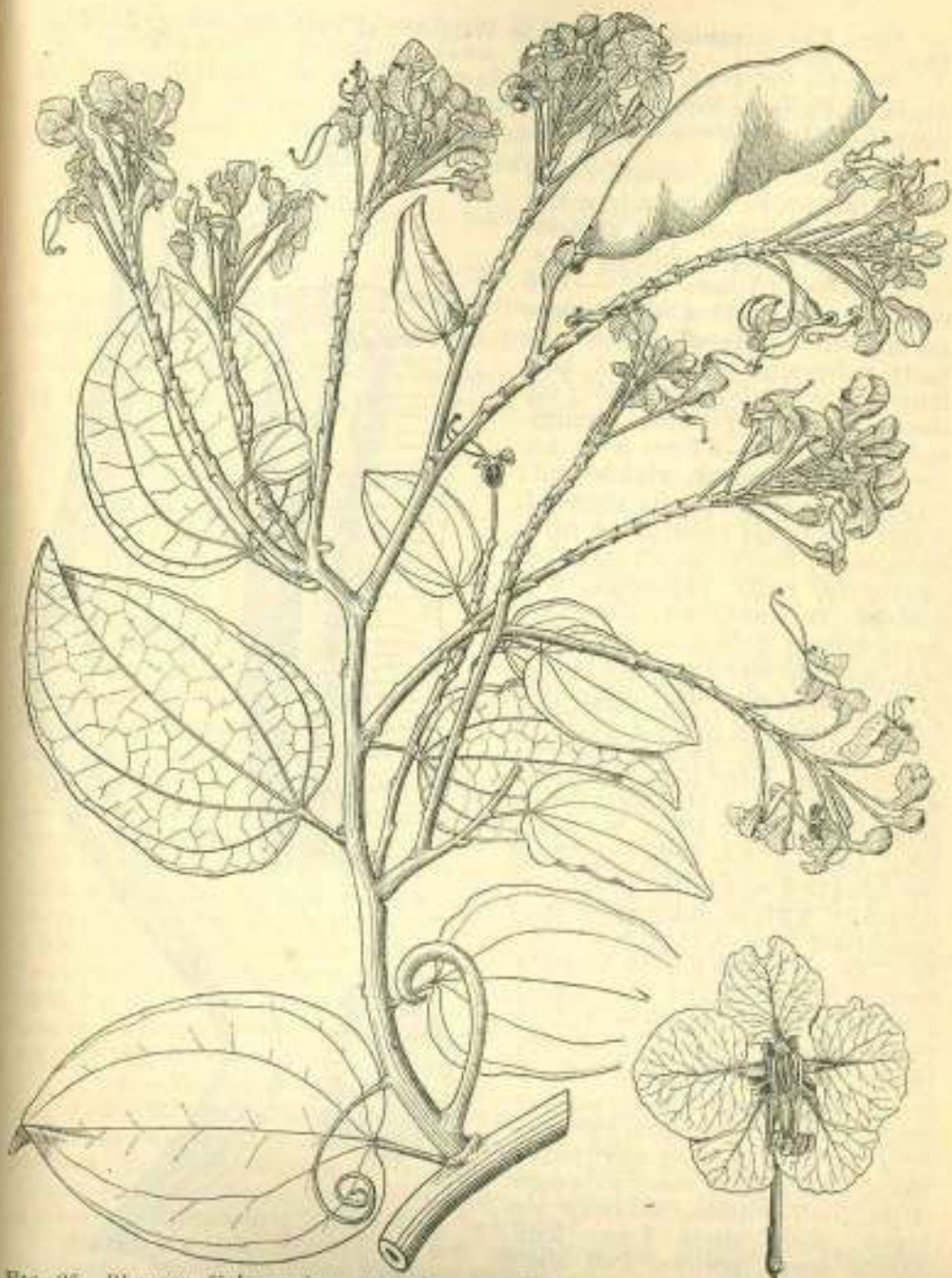


FIG. 25. *Phanera finlaysonian* var. *javanica* (Back.) de Wit: leaves and inflorescence, $\frac{1}{2}$ \times ; flower, 5 \times .

33c. Var. *javanica* (Backer) de Wit, var. & stat. nov.—Fig. 25, 26

Bauhinia leptopus f. *javanica* Backer, Bekn. Fl. Java, Nooduitg. 5 (Fam. 118): 23. 1941; in *Blumea* 5: 509. 1945.

A giant liana, stems coiled snake-like, up to 30 m tall; young shoots rusty pubescent, glabrescent. Leaves ovate to oblong, coriaceous, 5—sub-7-nerved; 6—12.5 cm long and 4—8 cm wide; upper surface shining, lower appressedly rusty pubescent, glabrescent; base truncate to shallowly cordate; top short-acuminate (acumen emarginate); petiole 1—2.5 cm long, top and base thickened, glabrescent; stipules obovate, broadly rounded, 5 mm long finely puberulous, early caducous. Flowers in short, often aggregate, rusty pubescent, corymbose racemes, on 2.5—4 cm long, densely puberulous pedicels; bracts and bracteoles rusty pubescent, early caducous, linear, the former 4—6, the latter 1.5—2 mm long. Receptacle distinctly striate, rather wide, infundibuliform, 6—8 mm long, silky, pubescent. Sepals coherent in 2—3 lobes, 6—8 mm long, more or less reflexed, along the insertion and in the basal part centrally with a puberulous (and glandular) zone on the adaxial surface. Petals about 2.5 cm long (including the 4—5 mm long claw), broadly ovate or obovate, outside rusty pubescent, inside nearly glabrous, crenate. Stamens 13—20 mm long; filaments glabrous; reduced stamens and staminodes 7—10, often in the upper part puberulous. Ovary on a rusty pubescent stipe, 5—7-ovulate, laterally glabrous; style about 5 mm long; stigma small, peltate. Pod about 12 cm long and 3—4.5 wide, up to 4-seeded.

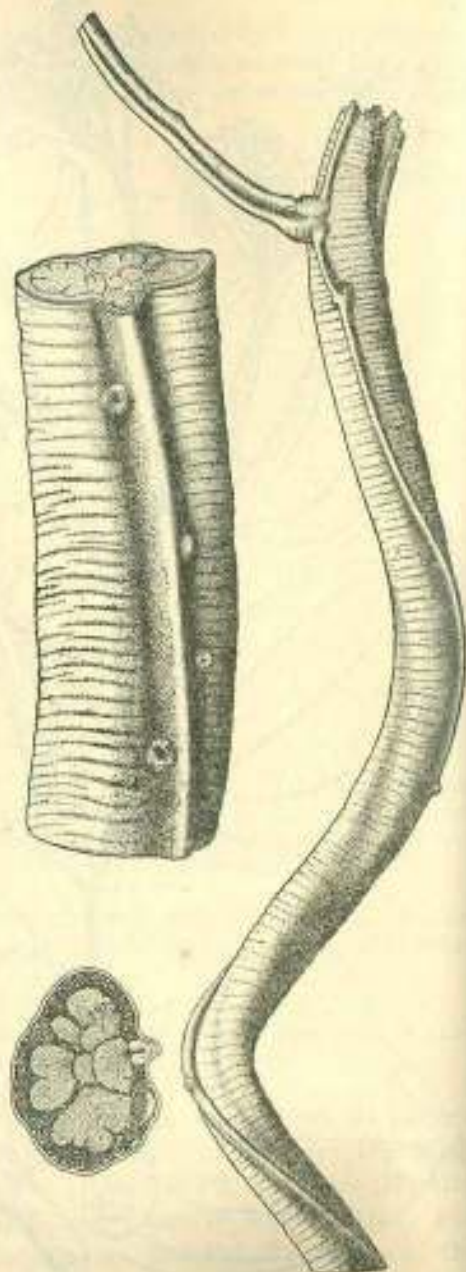


FIG. 26. *Bauhinia leptopus* f. *javanica* (Back.) de Wit; stem and twig, $\frac{1}{2}$ X.

TYPE.—Backer 17253 (holotype; BO).

DISTRIBUTION.—Malaysia: Java (W. Priangan: Bodjang Lopang, Djampang Kulon); Sumatra (Indragiri, Kuala Lau).

ECOLOGY.—Backer found it between 300 and 750 m altitude, locally rather frequent in forests and ravines. When in flower (November), very conspicuous by its at first orange-yellow, later red, very fragrant flowers.

LOCAL NAME.—Akar mangko mangko (Sumatra).

Backer (*l.c.*) correctly placed this with Perkins's *Bauhinia leptopus*. I found them both to be only varieties of *Phanera finlaysoniana*. This variety was cultivated in Garden at Bogor (Buitenzorg), sub XVII.E.12. Buwalda (6858) collected it in Indragiri in a marsh, in 1 m water, a yellow-flowered liana. Forbes 3114, also from Sumatra, belongs here.

33d. Var. *leptopus* (Perk.) de Wit, *var. & stat. nov.*

Bauhinia leptopus Perkins, *Frag. Fl. Philipp.* 1: 10. 1904; Merr. in *Philipp. J. Sci. (Bot.)* 5: 44. 1910; *Enum. Philipp. fl. Pl.* 2: 259. 1923. — *Bauhinia copelandii* Merr. in *Philipp. J. Sci. (Bot.)* 3: 230. 1908. — *Bauhinia ternatensis* Gagnep. in *Lec., Not. Syst.* 2: 180. 1912. — *Bauhinia hosei* Merr. in *Philipp. J. Sci. (Bot.)* 11: 80. 1916.

A shrubby climber; tendrils thinly pubescent; young shoots rusty-pubescent, later glabrescent. Leaves ovate, coriaceous, 5—sub-7-nerved, 3.5—5.5(—11) cm long and 3—4(—6.5) cm wide; base truncate to (very shallowly) cordate; top acuminate; lower surface subpersistently adpressedly puberulous (nerves pubescent) to glabrous (also on the nerves); petiole 0.5—1.5(—2.5) cm long, slender, with a thickened basal and apical joint; stipules not seen. Flowers in lax, open or dense corymbs on up to 5—8 cm long, slender, rusty-pubescent pedicels; bracts linear-acute, about 3 mm long, puberulous; bracteoles similar, subulate. Receptacle narrowly infundibuliform, striate, 7—9 mm long, coppery silky-pubescent. Sepals about 7 mm long. Petals rotundate to ovate, abruptly short-clawed, about 1.5 cm long, crenate, externally thinly rusty or silky-pubescent. Stamens 7—10 mm long; filaments glabrous, slender; reduced stamens and staminodes 7—10, subulate, glabrous, often half as long as the perfect stamens. Ovary on a rusty pubescent stipe, glabrous laterally but rusty pubescent on the sutures; style slender, glabrous; stigma peltate, comparatively large.

TYPE.—Warburg 12824 (holotype; *n.v.*).

DISTRIBUTION.—Malaysia: Philippines: Luzon (Tayabas, Quezon, Camarines), Mindanao (Lake Lanao; Davao, Mt. Apo), Leyte, Panay, Negros; Borneo: Sarawak: Baram Distr. (Marundi), British North Borneo: Sandakan (Gunung Samengaris); Sumatra (Lampung); Moluccas: Ternate, Amboina, Halmaheira (Djiko djir, Laleneon).

ECOLOGY.—"In forests at low and medium altitudes" (Merrill). Flowering March till June. Flowers yellow.

LOCAL NAME.—Gumiun (Halmaheira).

Phanera finlaysoniana is represented in the Philippines by the variety *leptopus*. The variety and the remainder of the species occupy only partly geographically distinct areas and are so closely related that I have not felt that "*Bauhinia leptopus*" might be accepted as a subspecies. The differences are just sufficient to maintain it as a variety. Perkins (*l.c.*) refers to "stamens 13, 3 fertile, 10 staminodial." I have not seen the type but found in Wenzel 639, from Leyte, seven reduced stamens and staminodes, an eighth being present as a minute subulate excrescence.

Gagnepain described *Bauhinia ternatensis* for the Moluccas. I saw the syntype (Hombron *s.n.*, P.) which proved to be *Ph. finlaysoniana* var. *leptopus*; Chr. Smith (*s.n.*; BM) was the first to collect it there (1797).

As a rule, the receptacle in *Ph. finlaysoniana* is coarsely striate. Gendren Stort 984, from Gunung Samengaris, has the receptacle smooth. This agrees closely with Ch. Hose 254 (K), from Marudi, the holotype of *B. hosei* which belongs here. Forbes's specimen (1703, Sumatra, Lampongs) is best placed here having 5—7-nerved leaves but its receptacle is slender and narrow and is like that in *Ph. kockiana* (Korth.) Benth., though shorter.

By the Bureau of Science, Manila, specimens were distributed under the name "*Bauhinia samarensis* Merrill" *nov. sp.*, which proved to belong here. The name *Bauhinia samarensis* was never published by Merrill, nor is it intended to be published here.

33e. Var. **montana** de Wit, *var. nov.*

Varietas foliis sub-5-nervis, pedicellis brevis, inflorescentiis subcorymbosis parvis, aggregatis, floribus albis, ovario subglabro, distincta.

Leaves variable, firmly chartaceous, acuminate, sub-5-nerved, 3—6 cm long and 2—3.5 cm wide, glabrous; petioles slender, 1—2 cm long. Flowers in many small, subcorymbose, greyish puberulous racemes; pedicels slender, 14—18 mm long; bracts and bracteoles subulate, minute, early caducous. Receptacle striate, 4—5 mm long, grey-brown pubescent. Sepals in 2—3, 5—7 mm long, reflexed lobes. Petals obovate, about 13 mm long (including the about 3 mm long claw), crisped, externally thinly pubescent. Stamens about 10 mm long; filaments glabrous; stamens and staminodes about 7, up to about 6 mm long; anthers broadly ellipsoid. Ovary glabrous but loosely pubescent on part of the stipe and lower part of the margin; style slender, about 5 mm long glabrous; stigma peltate.

TYPE.—Posthumus 2542 (holotype; BO).

DISTRIBUTION.—Malaysia: Celebes (Donggala, Palu), Ceram (Manusela).

ECOLOGY.—Flowering in November; in destructed forest, at about 1000 m altitude, near the western bank of the Lindu Lake.

Only the type is known. A specimen cultivated in the Botanic Garden at Bogor (XII.A.137 and XII.A.137a) was described as having white flowers with a red centre. This is a difference with the rest of *Ph. finlaysoniana*, whereas the numerous, aggregate, small, subcorymbose inflorescences, composed of short-pedicelled, small flowers and the nearly glabrous ovary characterize it further. This white-flowered variety was also collected at 700 m altitude in Central Ceram by Kornassi (1443; BO), and probably near Riring in the same island (Rutten 1815).

34. PHANERA LUCIDA Wall. ex Benth.

Phanera lucida Wallich ex Bentham in Pl. Jungh. 262. 1852, *haud quoad* syn. *B. emarginata* Jack. — *Bauhinia lucida* Wall., Cat. 5779a (& 7b), *nomen nudum*; Baker in Hook. f., Fl. Br. Ind. 2: 285. 1878; Prain in J. As. Soc. Bengal 66 (2): 188. 1897; Ridley, Fl. Mal. Pen. 1: 630. 1922. — *Bauhinia emarginata* (non Miller) Jack *sensu* Baker in Hook. f., Fl. Br. Ind. 2: 278. 1878.

A large climber or creeper, more than 30 m long; tendrils glabrous; young parts glabrous. Leaves ovate, entire, firmly chartaceous, 5-nerved (rarely 7-nerved), 7—15 cm long and 5—9 cm wide; base cordate; top blunt or acuminate, minutely emarginate; both surfaces bright glossy and glabrous, nerves on the lower surface with sparse, appressed minute hairs. Petiole slender, 0.5—2 cm long, glabrous; stipules not seen. Flowers in slender, erect, aggregate, terminal or lateral, 10—20 cm long, rusty puberulous racemes; pedicels 15—20 mm long, sturdy, silky puberulous; bracts lanceolate, long, (5 mm); bracteoles not quite opposite, subulate, 4 mm. Buds globose, pointed, golden silky-puberulous. Receptacle deeply ribbed, tubular, wide, about 7 mm long. Sepals coherent in 3—4, about 5 mm long lobes. Petals (broadly) ovate(-oblong), about 17 mm long (including the 5 mm long claw), externally rusty pubescent, bright yellow. Stamens 3 perfect; filaments about 10 mm long, glabrous; anthers scarcely exceeding 1 mm, opening by a central pore; reduced stamens and staminodes about 4. Ovary long-stiped (stipe rusty pubescent), glabrous (except on the sutures); style distinct, glabrous; stigma capitate. Pod (*teste* Prain) narrowly oblong, woody, about 10 cm long and 2.5 cm wide, glabrous; seeds 4—6, irregularly orbicular, compressed, 1 cm across.

TYPE.—Wallich 5779a (lectotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Penang, Perak (Larut; Batu Togo); Sumatra: Mentawai Is. (Siberut).

ECOLOGY.—"Clinging to large trees, open jungle" (Kunstler), also in dense and open forests, altitude 90—150 m; flowering from June to October. The Perak specimens have yellow flowers and the Siberut specimen (Boden Kloss) orange to red; the leaves of the latter specimen were apparently dull. If pollination does not take place and fruits are not set, the inflorescences have a strong tendency to lengthen.

In the leaf-characters *Ph. lucida* is the closest approach to Section 2. *Phanera (Bauhinia) lucida* Wall. was first published by Benthams (*l.c.*). He based it on Wallich 5779; there is no description but, when publishing *Ph. (Bauhinia) finlaysoniana*, two lines lower on the same page, Benthams mentioned some differences between the two and so *Ph. lucida* Wall. ex Benth. became validly published.

Wallich 5779, when distributed with the mimeographed Catalogue, was entered in that list as 5779/a and 5779/?b. I have been able to examine several specimens of Wallich 5779/a (DC. Herb.; L).

Bauhinia lucida Wall. when described by J. G. Baker (*in* Hook. *f.*, Fl. Br. Ind. 2: 285, 1878) was stated to be based on Wallich, Cat. No. 5779/b, a specimen "grown in the Calcutta garden from Penang." This was, Baker said, "totally different from 5779/a."

Prain based *B. lucida* Wall. on 5779/a [*in* J. As. Soc. Bengal 66 (2): 497, 1897]. He referred Wallich 5779/b to *Bauhinia piperifolia* Roxb.

Article 18 (Stockholm Code) prescribes that the first author who chooses a type must be followed (Note 3), which would imply that what was described by Prain as *B. lucida* and based on Wallich 5779/a must receive another name whereas Wall. Cat. No. 5779/b would typify *B. lucida* Wall. ex Baker and also *Phanera lucida* Wall. ex Benth. *Phanera lucida* in the Benthamsian sense would be, were this procedure followed, as Prain rightly pointed out, be reduced to the synonymy of *B. piperifolia* Roxb., an extra-Malaysian species.

Benthams made no distinction between Wall. 5779/a and Wall. 5779/b though the two are different at first sight. Possibly he did not really consider Wallich 5779/b to belong with 5779/a in a single number; in the mimeographed Catalogue, Wallich 5779/b has a question mark.

It is to be observed that in his descriptive data Benthams compared *Ph. finlaysoniana* Grah. ex Benth. with *Ph. lucida*, which means that the specimens resembled each other so closely that a remark on their resemblance and difference seemed sufficient to characterize *Ph. lucida*. Now *Ph. finlaysoniana* and *Ph. lucida* (as represented by Wallich 3779/a) bear a definite resemblance, whereas *Ph. piperifolia* is very distinctly different. I think, therefore, that Article 18bis (Stockholm Code) authorizes Prain's choice of Wallich 5779/a as the type as it is "shown that (Baker's) choice was based on a misinterpretation of the original description," and so the latter's choice of the type is not binding. In this manner the Code allows that *Ph. lucida* is maintained as a Malaysian species in accordance with Prain's typification and description (see also under *Ph. bidentata* (Miq.) de Wit subsp. *bicornuta*).

35. *Phanera menispermacea* (Gagnep.) de Wit, *comb. nov.**Bauhinia menispermacea* Gagnepain in Lec., Not. Syst. 2: 176. 1912.

A climbing shrub; tendrils few, weak. Leaves ovate, coriaceous (when dry with involute margins), delicately reticulate on both surfaces, 7-nerved (midrib much the stouter), the side-nerves short, 6—10 cm wide, 12—15 (—17) cm long; glabrous on both surfaces, the lower glaucescent; base very deeply cordate; top long acute, sub-mucronate; petiole stout, glabrous, 3—4.5 (—7) cm long; stipules not seen. Flowers in numerous, lateral, rather lax corymbs on very slender, 4—6 cm long, glabrous, pedicels; bracts early caducous, linear, acute, 5 mm long, woolly ciliate; bracteoles not opposite, minute, ovate, acute, 1—2 mm long, glabrous. Buds globular. Receptacle cylindrical, not widened at the base, 6—8 mm long, smooth, glabrous. Sepals free, acute, 6—7 mm long, glabrous. Petals subunguiculate (claw less than 0.5 mm long, fleshy), rather narrowly obovate (3—6 mm wide), 10—15 mm long, crenate, glabrous. Stamens 2—4 fertile; filaments 6—7 mm long; anthers broader than long, about 1 mm through, the thecae opening by a large central pore; staminodes 6—8, of decreasing length, longest 4 mm; all filaments glabrous and incrassate towards the base. Ovary glabrous; stipe long, slender, glabrous or with a few coppery hairs; style 4 mm long; stigma peltate.

TYPE.—Haviland et Hose 1014 P (holotype; K).

DISTRIBUTION.—Malaysia: Borneo: Sarawak (near Matang), West Borneo.

LOCAL NAME.—Garai probably.

ECOLOGY.—Flowers yellow, appearing in December. The name refers to the leaf which is of a strikingly menispermaceous habit. The Reverend Dunselman found it near Mandor (W. Borneo) at 50 m altitude on a sandstone plateau where it was frequent. The flowers in the type specimen were yellow (Sarawak) but Dunselman described them as white, the petals at the base red, the stamens red.

Phanera menispermacea is nearest to *Ph. cardiophylla* (Merr.) de Wit. There are the glabrous stipe and disc, the coriaceous, larger and very deeply cordate leaves, the larger flowers with glabrous petals, and the larger, laxer inflorescences to distinguish it.

36. *Phanera moultonii* (Merr.) de Wit, *comb. nov.*—Fig. 27*Bauhinia moultonii* Merrill in Philipp. J. Sci. (Bot.) 11: 82. 1916. — *Bauhinia rosulenta* Ridley in Kew Bull. 1929: 256.

36a. Var. MOULTONII.

A climbing shrub; tendrils compressed, appressedly red pubescent; young parts appressedly red-rusty puberulous. Leaves broadly orbicular to broadly ovate, coriaceous, 9—11 (sub—13)-nerved (the nerves very prominent and carinate on the lower surface), 5—9 cm across; base broadly and shallowly cordate; top very broadly rounded or shortly acute, emar-

ginate or shortly bilobed (sinus narrow); glabrous on the upper, appressedly red-rusty pubescent on the lower surface, gradually more glabrous but persistently pubescent on the nerves; petiole 2—5 cm long, terete, at first pubescent; stipules not seen; intrastipular trichomes well-developed, delicately subulate. Flowers in aggregate, small, not very dense, rusty puberulous corymbs, on up to 3 cm long, slender, red-rusty puberulous pedicels; bracts linear-acute, about 2 mm long, puberulous especially on edge, early caducous; bracteoles minute, ovate, acute, just below the middle of the pedicels. Buds globose, apiculate, red-rusty puberulous. Receptacle tubular, its base not dilated, more or less striate, 4 mm long, rusty puberulous. Sepals more or less ovate, acute, about 6 mm long, more or less reflexed. Petals (narrowly) oblong, crisped, about 11 mm long, 4—5 mm wide, thinly rusty-silky pilose externally, gradually tapering to a short about 1 mm long claw. Stamens about 4 mm long; filaments glabrous; anthers broader than long, small; reduced stamens and staminodes 5, up to nearly as long as the fertile stamens. Ovary on a short, thick, rusty-pubescent stipe, glabrous except for the sparsely, rusty-hirsute basal-lateral part; style glabrous, slender, recurved; stigma knob-shaped or peltate, small.

TYPE.—Native collector, Bureau of Science 202 (holotype of *Bauhinia moultonii*; A).

DISTRIBUTION.—Malaysia: Borneo: Sarawak (near Kuching; Garai?; Mt. Matang; Indonesian Borneo (Sintang; Pulu Pendulak, Bukit Pegah).

ECOLOGY.—Flowers pinkish, filaments red. J. Hewitt noted: "Petals pale green with pink tinge. Base of filaments red." Flowering in July—October. Low or medium altitudes. Miss Polak (1960) noted at Pulau Pendulak: "flower purple-green." Teysmann (H.B.8312) wrote: "flore roseo."

The paratype of *Ph. moultonii* (Native collector; Bureau of Science 201; A) is evidently allied to *Ph. wrayi* (Prain) de Wit and very probably represents *Ph. wrayi* var. *wrayi*. This is uncertain because the specimen is sterile. Haviland 927 (holotype of *Bauhinia rosulenta*; K) belongs to *Ph. moultonii*.



FIG. 27. *Phanera moultonii* (Merr.) de Wit: inflorescence and leaves, $\frac{1}{2} \times$; flower, $1\frac{1}{2} \times$.

36b. *Var. rubella* de Wit, *var. nov.*

Varietas foliis 11-nervatis, bilobatis, glabrioribus et floris maioribus laete luteis marginibus rubellis a *Ph. wrayi* var. *cancellata* (Ridley) de Wit differt.

A climber; tendrils few, slender; young parts red-rufous pubescent. Leaves broadly obovate, usually broader than long, subcoriaceous, 9—11-nerved, 4—5 cm long and 5—6 cm wide; base broad, shallowly lobed; top-lobes broadly rounded; both surfaces delicately reticulate, the lower when young very thinly, appressedly red-rufous pubescent, later glabrous, except near the base; nerves minutely appressed red-rufous puberulous; petiole about 2.5 cm long; red-rufous puberulous; stipules not seen. Flowers in short, glabrous corymbs, on top of short side-branches, on slender, 4—5 cm long, glabrous pedicels; bracts and bracteoles not seen. Buds globose, apiculate. Receptacle tubular, not dilated at base, indistinctly striate, about 5 mm long. Sepals coherent in 3 lobes, ovate, about 5 mm long, glabrous. Petals differing in shape, oblanceolate to unequal-sided obovate, crisped, 10—12 mm long including the short, fleshy claw, externally sparsely hirsute in the median zone. Stamens 5—6 mm long; filaments glabrous, thickened at the base; anthers subglobose, nearly basifixed, opening by a comparatively large, fusiform pore; reduced stamens and staminodes 5—6, glabrous, nearly as long as the fertile stamens. Ovary on a thinly pubescent stipe, glabrous except for a few sparse hairs near the dorsal suture, about 4-ovulate; funicular forks nearly as long as the ovule; style recurved, 3—4 mm long, glabrous; stigma peltate, small.

TYPE.—Buwalda 6737 (holotype; BO).

DISTRIBUTION.—Malaysia: Sumatra (Kuala Belilas; Sungai Berapit-Pekan Haran).

ECOLOGY.—Buwalda 6675 had a note stating that the "flowers" were "light yellow, margins pink." The type specimen was said to have "pink" flowers. Presumably the flowers are at first yellow and turn pink. It occurs at low altitude in primary forests in slightly marshy country.

Phanera moultonii var. *rubella* is an approach to *Ph. wrayi* var. *cancellata* (Ridley) de Wit but the leaves are 9—11-nerved, different in shape (sinus wide), more glabrous, and bilobed. The flowers are slightly larger and different in colour. It differs from *Ph. moultonii* var. *moultonii* in that the leaves are deeper bifid (sinus wide), and in the glabrous buds and pedicels; the stipe and style seem to be longer.

37. *Phanera posthumi* de Wit, *sp. nov.*

Species sectionis *Palmatifoliae* tamen ex affinitate *Ph. elmeri* (Merr.) de Wit sed longe differt alabastris, floribus et inflorescentiis majoribus, pedicellis longioribus, foliis tamen minoribus, palmatinervatis, filamentis staminorum glabris haud sparse hirsutis.

A climber; tendrils glabrous, rather thick. Leaves entire, (ob)ovate to oblong, coriaceous, 5—7-nerved; 7—8 cm long, 4—5 cm wide; base

cordate; top short-acuminate; both surfaces half dull and entirely glabrous; petiole with swollen top and base, about 2.5 cm long, glabrous; stipules not seen. Flowers in large, often aggregate, broad, sometimes subcorymbose racemes (up to 25 cm long and about 15 cm wide), which form compound, leafy panicles, on sturdy, angulate, 6—9.5 cm long, pedicels; axis and pedicels when very young red-rusty puberulous but soon entirely glabrous; bracts and bracteoles early caducous, not seen. Buds ovoid, blunt-tipped (when dry) strongly ribbed, large (about 8 mm through), very soon glabrous. Receptacle fleshy, strongly ribbed, wide, 5—8 mm long, early glabrescent. Sepals fleshy, coherent in 2—3 lobes, about 8 mm long, more or less reflexed. Petals unequal-sided, more or less orbicular, crenate, about 2.5 cm long including the about 5 mm long, abrupt, fleshy claw, externally densely rusty-pubescent. Fertile stamens 10—11 mm long; filaments fleshy, glabrous; anthers ellipsoid, opening by an oblong, large, central pore; reduced stamens and staminodes 8, fleshy, up to 6 mm long, very thick, glabrous. Ovary on a thick, fleshy, glabrous stipe, glabrous, 7-ovulate; style short, glabrous; stigma peltate large.

TYPE.—Posthumus 914a (holotype; BO).

DISTRIBUTION.—Malaysia: Sumatra (Djambi, Mt. Ketiduran).

ECOLOGY.—The flowers contain an exceptional amount of honey. The type specimen was collected at 140 m altitude, in flower on October 24, 1925.

This new species is named after the late Prof. Dr. O. Posthumus (1898-1945) who weathered with me difficult years in perfect understanding and mutual support but was, in the end, murdered. He collected this species on his Djambi Expedition in 1925.

38. PHANERA PYRRHONEURA Benth.—Fig. 28

Phanera pyrrhoneura Benth in Pl. Jungh. 262. 1852; Miq., Fl. Ind. bat. 1 (1): 63. 1855. — *Bauhinia pyrrhoneura* Korthals in Verh. nat. Hist., Bot. 88 pl. 11. 1841 (sub *B. pyrraneura*). — *Bauhinia xanthoneura* Kerth. ex Benth. in Pl. Jungh. 262. 1852. — *Phanera catalpaefolia* Miq., Fl. Ind. bat. 1 (1): 1079. 1858. — *Phanera acuminatissima* Miq., Fl. Ind. bat., Suppl. Sumatra 287. 1862.

A climber; branches compressed; bark ribbed; young twigs and tendrils rusty-tomentose. Leaves very broadly ovate to orbicular, entire, chartaceous, 9—11-nerved; up to 20 cm in diameter; base deeply cordate; top abruptly acuminate or cuspidate, tip 8—25 mm long; upper surface glabrous, bright, lower surface thinly appressed-puberulous and rusty-tomentose on the nerves; petiole 4—7 cm, top and base swollen; stipules oblong, rounded, about 3 cm long, pubescent, early caducous. Flowers in aggregate corymbs, on angulate, 4—5 cm long, rusty-puberulous pedicels; bracts obtuse, small; bracteoles not opposite, acute, minute, early caducous. Buds ovoid, blunt-tipped, with 5 grooves and 10 ribs, rusty-pubescent. Receptacle obliquely dilated at base, prominently striate, wide, 7—8 mm

long. Sepals coherent in 2—3 ovate, reflexed lobes, about 8 mm long. Petals broadly oval to orbicular, crisped, abruptly clawed (claw 3 mm long), about 2—3(—4) cm long, externally on the prominent, stout nerves tomentose. Fertile stamens about 5 mm long; filaments thick, curving, glabrous; anthers broad, ellipsoid, opening by a central pore in each theca; reduced stamens 5—7. Ovary glabrous, except for the short stipe and the sutures, about 4-ovulate; style short, with a hairy rim; stigma peltate, large.

TYPE.—Korthals *s.n.* (holotype; U).

DISTRIBUTION.—Malaysia: Sumatra (Mt. Melintang; Aek Bila-Marbau).

ECOLOGY.—The leaf-blade contains numerous pellucid glands visible on slight magnification against the light. Flowers yellow, possibly not discolouring. The Banghams (1221) collected it in October on the edge of virgin jungle (Sumatra, Nabara-West) and found the flowers lemon yellow, intensely fragrant but pleasing.

LOCAL NAME.—Akar sidjangkeh (Sumatra).

Korthals rightly mentioned its affinity to *Ph. (Bauhinia) integrifolia* Roxb. *Phanera bidentata* (Jack) Benth. is another close ally but *Ph. pyrrhoneura* is larger in all its parts, the deeper cordate, broader, and cuspidate leaves have more nerves, the broader and wider receptacle is nearly equally

long as the sepals and manifestly striate, the petals are broadly oval and abruptly clawed. The holotype of Miquel's *Ph. catalpaefolia* H.B. 856; Teysmann *s.n.*, Lubuksikaping, Sumatra West Coast; U) consists of leaves only and appears to belong here. The same applies to *Ph. acuminatissima* Miq. (H.B. 888; Teysmann *s.n.*, Lubukalung, Sumatra West Coast; U).

39. *Phanera wrayi* (Prain) de Wit, *comb. nov.*

Bauhinia wrayi Prain in J. As. Soc. Bengal 66 (2): 191, 497. 1897; Ridley, Fl. Mal. Pen. 1: 632. 1922.

31a. Var. WRAYI.

A woody creeper or straggling shrub; tendrils few; young parts red-rusty pubescent, soon glabrescent. Leaves ovate or roundish, entire, subcoriaceous, 5—7-nerved, midrib stoutest, 5—7.5 cm long, 3—4.5 cm wide; base truncate; top tapering from the middle, acute or acuminate (sometimes round in Bornean material); lower surface glaucous and, when very young, appressedly rusty-pubescent, finally almost glabrous, the nerves glabrescent; petiole slender, 1—2 cm long; glabrescent; stipules unknown.

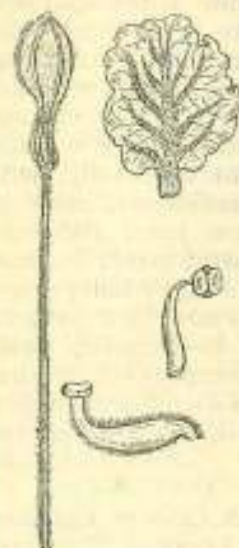


FIG. 28. *Phanera pyrrhoneura* (Korth.) de Wit: bud, petal, stamen, and ovary, $1\frac{1}{2} \times$.

Flowers in dense, pseudo-lateral, up to 10 cm long, rusty pubescent, finally glabrescent racemes, the lower flowers all caducous, the remaining terminal portion corymbose; pedicels 3—4 cm long, very slender, sparsely rusty pubescent to glabrous; bracts linear-acute, 3 mm long; sparsely, appressedly, red-rusty puberulous; bracteoles minute, early caducous. Buds (upper part) spherical, apiculate (apex pubescent), rusty pubescent to glabrous, splitting into 3 ovate, more or less acute, finally reflexed, about 4 mm long lobes. Receptacle not inflated, slender, up to 4 mm long, smooth, appressedly rusty pubescent, or glabrous. Petals broadly oblanceolate, about 10 mm long and 0.4 cm wide, pubescent externally, with few sparse hairs internally, margins crenate, claw indistinct, more or less fleshy. Stamens 3 fertile; filaments about 5 mm long, glabrous; anthers small, broader than long, opening by a central pore; reduced stamens and staminodes 5—7. Ovary on a distinct, red shaggy hairy stipe, otherwise quite glabrous, 3—4-ovuled; style about 4 mm long; stigma distinct, capitate. Pod thin-valved, broad-elliptic, flat, 1—3-seeded, about 7 cm long, about 3 cm wide, smooth, glabrous; seeds compressed, notched at hilum, broadly ovate, 1.5 cm across; albumen copious; funicle triangular, short; funicular branches very slender, unequal, one shorter, the other longer than $\frac{1}{2}$ the circumference of the seed.

TYPE.—Kunstler 5243 (lectotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Perak (Assam Kumlong Plains; Larut); Borneo: W. Borneo (near Sinkawang), Sarawak (Kuching; Mt. Batang); Sumatra (Djambi, Sungai Manau).

ECOLOGY.—At low altitude (about 100 m) in Perak, flowering in May; flowers pale yellow or white becoming pink. The Reverend Dunselman collected it on a sandy "padang," where it was locally frequent in marshy places at the foot of a sloping layer of bog-ore (W. Borneo). A specimen from Sarawak (Clemens 20900, collected at about 275 m altitude on Mount Matang) belongs here and had purple stamens. It differs slightly from the Malay Peninsula variety *wrayi* by a red-brown woolly tomentum (so common in Bornean forest plants) and round-topped, more or less emarginate, 7-nerved leaves. On the other hand, Beccari 825 has both acute and rounded leaves.

31b. Var. *cancellata* (Ridley) de Wit, *comb. nov.*

Bauhinia cancellata Ridley in Kew Bull. 1929: 256.

A climbing shrub; young twigs zig-zag, woolly puberulous. Leaves ovate, emarginate to $1/3$ bifid, 5—7-nerved (nerves strongly branching, very prominent on lower surface), midrib often mucronulate, more or less coriaceous, 6—8 cm long, 4—6 cm broad; base rounded, truncate, or shallowly cordate; top-lobes (if present) not broad, rounded; upper surface reticulate, more or less dull, lower surface loosely reddish hirsute, denser so on the nerves; petiole slender, up to about 3 cm long, only at first reddish woolly pubescent; stipules falcate, about 3 mm long, hirsute externally but with one glabrous margin. Flowers in compound, short, glabrous racemes; pedicels slender, up to 3 cm long, glabrous; bracts rather long,

narrowly lanceolate, about 7 mm long, more or less glabrous, margins pubescent; bracteoles shorter. Buds globose, apiculate, glabrous or with a few, coppery, pubescent hairs. Receptacle tubular, glabrous (except a few puberulous hairs near the base), about 5 mm long, indistinctly striate. Sepals coherent in 3 lobes, ovate, more or less acute, about 5 mm long. Petals with a glabrous, about 1 mm long claw, blade oblanceolate, crisped, 7—8 mm long, externally sparsely hairy in the median zone, purple. Fertile stamens about 5—6 mm long; filaments thickened at the base, glabrous or nearly so; anthers nearly basifixed, broad-elliptic, not exceeding 2 mm; reduced stamens and staminodes 6, nearly as long as the fertile stamens. Ovary and style glabrous; stipe short, rufous-strigose; stigma capitate, bilobed.

TYPE.—Mohammed Nur 11559 (holotype; K).

DISTRIBUTION.—Malaysia: Malay Peninsula: Negri Sembilan (Gunong Angsi, west-side); Borneo: British North Borneo (Klias Beaufort), Sarawak (Mt. Matang); Sumatra (Atjeh).

ECOLOGY.—The type specimen was collected at 850 m altitude, on November 20, 1923, just bursting into flower. I found a second specimen, collected by Ridley in 1904, from the same locality, with the note "flowers greenish pink."

LOCAL NAME.—Lorsy (Bisaya).

Ridley (*l.c.*) stressed the presence of a "tuft of red hairs on the disc" at the base of the ovary as a distinctive character. Though a few hairs occur on the disc, the tuft is growing on the ovarial stipe, a character not uncommon in allied species.

L. Apostol collected in British North Borneo specimens (nos. 2396, 2433) with broadly ovate, about 3 cm long, 7-nerved, shortly bifid leaves. The buds were glabrous and the flowers white and yellow. The specimens were distributed as "*Bauhinia cardiophylla* Merrill" but that taxon is different in having glabrous, acute, entire leaves and very different bracts which are, in Apostol's specimens, similar to those found in *Ph. wrayi* generally. From the latter taxon, Apostol 2396, 2433 are different in the size of the leaves, the colour of the flowers, and the anthers being broader than long, whereas in *Ph. wrayi* var. *cancellata* in the Malay Peninsula the anthers are just longer than broad. Apostol's specimens are best placed here.

Section 3. *Cinnamomifolia* de Wit, *sect. nov.*

Folia integra, basi acuta sive leviter anguste cordata, rarissime late cordata, apice plerumque acuminata; nervis 3 crassioribus, raro 5, tamen nervis 2 inconspicuis, nervis lateralibus campylodromis in apicem saepe paralleli ad marginem et segmentum centralem symmetricam fusiformem sive ellipticam semper limitantibus.

Leaves narrowly to broadly ovate, as a rule elliptic-oblong, never broader than long, entire; base acute to shallowly cordate; top as a rule acuminate; distinct nerves 3, rarely 5, of which 2 inconspicuous, the lateral nerves campylodromous, often running parallelous with the margin, reaching the top and so delimiting a symmetrical, fusiform or elliptic, central section in the blade.

TYPE SPECIES.—*Phanera kockiana* (Korth.) Benth.

ARTIFICIAL KEY TO THE TAXA OF PHANERA SECTION CINNAMOMIFOLIA

1. Inflorescence an elongated raceme. Sepals as long as the receptacle. Leaves glabrous. Flowers greenish. Ovary glabrous or nearly so, stipe glabrous. 40. *Ph. elmeri*
1. Inflorescence corymbose. Sepals half as long as the receptacle. Leaves as a rule, when young, rusty puberulous on the lower surface. Flowers yellow to red.
2. Receptacle at least 16—20 mm long. Tendrils absent or present. Stipules (as far as known) scutish.
3. Leaves small, up to about 8 cm long. Pedicels up to 2.5 cm long. Tendrils early caducous. 41c. *Ph. kockiana* var. *sericeinervis*
3. Leaves large, about 15—25 cm long. Pedicels 5—8 cm long.
4. Transversal veins prominent, numerous. 43. *Ph. scarlatina*
4. Transversal veins inconspicuous. 42. *Ph. lambiana*
2. Receptacle less than 16 mm long, rarely up to 18 mm. Tendrils present. Stipules rounded.
5. Ovary entirely red-brown hirsute.
6. Transversal veins perpendicular. Petiole short, thick, red-brown tomentose. Bracts ovate, more than 10 mm long. 41b. *Ph. kockiana* var. *burbridgei*
6. Transversal veins not perpendicular. Petiole slender, glabrescent. Bracts narrowly oblong, less than 10 mm long. 41a. *Ph. kockiana* var. *kockiana*
5. Ovary wholly or laterally for the greater part glabrous. Petiole often about 1 cm long or longer.
7. Receptacle 8—10 mm long, dilated at the base. Leaves sub-5-nerved, woolly pubescent on the lower surface. 41d. *Ph. kockiana* var. *velutina*
7. Receptacle 11—18 mm long, not or vaguely dilated at the base. Leaves 3-nerved, on the lower surface glabrescent or glabrous. 41a. *Ph. kockiana* var. *kockiana*

40. *Phanera elmeri* (Merr.) de Wit, *comb. nov.*

Bauhinia elmeri Merrill in Univ. Calif. Publ. Bot. 15: 102. 1929.

A climbing shrub with very few tendrils. Leaves oblong to elliptic, entire, stiffly coriaceous, with 3 stout nerves and one pair of slender short nerves near the margin, transverse nerves indistinct, not perpendicular, 8—20 cm long, 4—8 cm wide; base cordate to rounded; top bluntly acuminate to obtuse; upper surface shining, lower surface soon glabrous, thinly fugaciously pubescent at first, duller; petiole stout, 5—10 mm long, glabrescent; stipules not seen. Flowers in (always?) aggregate (narrow), about 10—15 cm long, rusty-pubescent, warty racemes, on sturdy brown pubescent pedicels, not exceeding 2.5 cm in length; bracts ovate, small;

bracteoles subulate, minute. Buds globular or ovoid, pointed, fulvous pubescent. Receptacle (widely) tubular, obliquely infundibular, about 8 mm long, brown or golden pubescent. Sepals coherent in 2 broadly ovate, 7—10 mm long lobes. Petals roundish, shortly and abruptly clawed, crisped, about 1.5 cm in diameter, externally brown hirsute, yellowish or whitish green. Stamens 3 perfect; anthers thick, ellipsoid, opening by a central pore; filaments sparsely hairy (full-grown not seen); reduced stamens 7, comparatively well developed. Ovary on a rusty-pubescent stipe, laterally glabrous, also on the larger part of the suture; style slender, short, glabrous; stigma peltate. Pods oblong, thinly valved, about 12 cm long, 3.5 cm broad, smooth, glabrous; seeds 3—5, albuminous, compressed, 18 mm in diameter; funicle triangular, broadening onto the hilum and there forked, capillary branches running along edge of seed for 3/4 of its circumference.

TYPE.—Elmer 21786 (lectotype; A).

DISTRIBUTION.—Malaysia: Borneo, British North Borneo (Elphinstone Prov., near Tawao); Indonesian Borneo (Peak of Balikpapan, Sembuni, sandstone, 650 m alt.).

Phanera elmeri is allied to *Ph. kockiana* var. *kockiana*, but differs specifically in having much shorter pedicels, a different receptacle, an oblong raceme, and yellowish-green to greenish-white coloured flowers; the rusty hairiness on the leaves, always more or less evident in *Ph. kockiana*, is absent and the dry specimens have a peculiar pallid hue.

41. PHANERA KOCKIANA (Korth.) Benth.

Phanera kockiana (Korth.) Bentham in Pl. Jungh. 262. 1852; Miq., Fl. Ind. bat. 1 (1): 63. 1855. — *Bauhinia kockiana* Korthals, Verh. nat. Gesch., Bot. 87 pl. 10. 1841; Prain in J. As. Soc. Bengal 66 (2): 190, 497, 1897. — *Bauhinia burbidgei* Stapf in Trans. Linn. Soc., Lond. (Bot.) 2 (4): 143. 1894. — *Bauhinia creaghii* Baker f. in Kew Bull. 1896: 21. — *Bauhinia kocheana* Baker f. in Kew Bull. 1896: 22.

41a. Var. KOCKIANA.

Bauhinia kockiana Korth., Verh. nat. Gesch., Bot. 87 pl. 10. 1841.

A large tendrilled liana with flattened stems, up to 30 m tall; young shoots densely red-brown tomentose or silky-pubescent; branchlets glabrescent. Leaves oblong, ovate or elliptic-oblong, 3-nerved (nerves sunk on upper and very prominent on lower surface), rarely sub-5-nerved, entire, subcoriaceous, 8—14 cm long, 4—6 cm wide; base obtuse; top produced into a blunt, emarginate, up to about 1 cm long acumen; upper surface shining, lower, when young very sparsely appressedly hairy (appressedly pubescent on nerves), and finally glabrescent; petiole usually short (about 5 mm), red-brown tomentose or puberulous; stipules auriculate, rounded, puberulous. Flowers in lateral or terminal flat-topped on depressed, red-brown tomentose, pubescent or glabrescent corymbs, on up to 4—5(—6.5) cm long pedicels; bracts ovate-oblong, acute, about 10 mm long, woolly

pubescent outside; bracteoles linear, placed far below middle of pedicels, about 3 mm long. Buds globular, acute. Receptacle narrowly tubular, very slightly dilated at the base, striate, finally 11—14 (18!) mm long, red-brown tomentose to fulvous-puberulous. Sepals coherent in 2—3 lobes, ovate, acute, 5—8 mm long, pubescent glabrous inside. Petals nearly or very shortly clawed, blade broad-(ob)ovate, crisped-crenulate or flat, 2—2.5 cm in diameter, externally on and among the nerves centrally more or less hirsute, inside almost glabrous. Fertile stamens up to 8 mm long, about equalling the ovary; filaments glabrous; anthers small (not exceeding 3 mm), thick, opening by a central pore; reduced stamens and staminodes 3—5. Ovary shortly stiped, (shaggy red-brown hirsute or) laterally glabrous; style short, nearly glabrous; stigma capitate. Pod narrowly elliptic, thin-valved, about 15 cm long, glabrous; seeds flat, broadly ovate, about 2 cm across, albuminous; funicular branches 3/4—7/8 as long as the circumference of the seed.

TYPE.—Korthals s.n. (L).

DISTRIBUTION.—Malaysia: Malay Peninsula: Pahang (Pontian), Johore (Kota Tinggi-Mawai Road; Gunung Blumuh; Temakiang Road; Sungai Kaju); Borneo: Sarawak (Kuching; Marudi), British North Borneo (Timbu Mata Forest Res.; Sandakan, Myburgh Prov.; Boli R.; Tawao, Elphinstone Prov.; Tiaggau R.; Mt. Kinabalu, Dallas; Penibukan; Kaung; Kinataku R.); East Borneo (W. Kutei); Sumatra (West Coast: Fort de Kock, Padang. Harau Ravine; East Coast: Asahan, Bandarpulau; Inderagiri; N side of Ranau Lake; Palembang; Muaradua; Lampung; Penanggungan); Batu Is. (Pifi Is.); Celebes (Pangkadjene).

ECOLOGY.—From sealevel to 1200 m altitude, on plains, hills, on edge of streams, forests or jungles, abundantly flowering with masses of yellow, orange to brilliantly scarlet flowers.

Korthals described *Ph. kockiana* for the forests of the lower slopes of Mt. Melintang, east of Padang. It was one of the largest climbers, with compressed stem, glistening leaves, and brilliantly yellow, finally red, flowers, seen from afar among the tops of the highest trees. Van Steenis found, on the north-side of the Ranau Lake, the tree tops brilliantly red by these flowers; the anthers were salmon coloured. His specimens (no. 3407) are an approach to *Ph. finlaysonianae* Grah. ex Benth., the leaves being 5-nerved. The narrowly tubular receptacle which is considerably longer than the sepals proved it to belong to *Ph. kockiana*.

LOCAL NAMES.—Tagulogulog, urat tembadau, tali adap, tongkurangan (British North Borneo), tagalap (Dusun Kina-batangan), akar djangan (Sumatra, Djambi).

USES.—In British North Borneo used in religious ceremonies.

One sheet at Leiden of Korthals's type material bears a label having "Borneo" as the finding locality. The stage of development and general appearance of the branchlets agree so closely with the four other sheets (from Sumatra) typifying *Bauhinia kockiana* that I conclude that the Borneo label was erroneously added to one sheet which carries actually

Sumatran material. Korthals himself limited his species to Sumatra. The type, therefore, is entirely Sumatran.

In Sumatra specimens occur which demonstrate a closer affinity to *Ph. finlaysoniana* Grah. ex Benth. than is usual. They are distinguishable by their narrow receptacle, which becomes longer than the sepals and their larger flowers. Endert (2979) in Borneo (W. Kutsi) found *Ph. kockiana* rarely, on rocky river banks as an about 20 m tall climber. Like all collectors he comments on its beauty. The Celebes specimens, Teysmann H.B.11988; BO) have narrow glabrous leaves and the receptacle is strongly ribbed; the ovary is glabrous with the exception of a few fugacious hairs on the stipe. The petiole is slender, up to 3.5 cm long. A second specimen of the same locality (Pangkadjene); H.B.12099) had white flowers. They may represent an undescribed variety.

41b. *Var. burbidgei* (Stapf) de Wit, *var. & stat. nov.*

Bauhinia burbidgei Stapf in Trans. Linn. Soc., Lond. (Bot.) 2 (4): 143. 1894.

A "climbing tree" (Burbidge), up to 30 m tall; shoots densely red-brown tomentose, hairs spreading. Leaves oblong or elliptic-oblong, 3-rarely sub-5-nerved (nerves distinctly impressed on the upper surface, on the lower surface connected by many prominent, perpendicular side-nerves), subcoriaceous, 8—14 cm long, 4—6 cm wide; base obtuse; top produced in a blunt or acute, about 1 cm long acumen; upper surface more or less shining, lower dull, sparsely hairy (denser so on the nerves), finally glabrescent; petiole short, thick, about 3 mm long, redbrown tomentose; stipules not seen. Flowers in lateral or terminal redbrown tomentose corymbs, on up to 4.5 cm long tomentose pedicels; bracts ovate, acute, over 1 cm long outside sparsely pubescent; bracteoles linear, about 5 mm long. Receptacle narrowly tubular, very slightly dilated at the base, finally 11—16 mm long, red-brown tomentose, striate. Sepals coherent in pairs, ovate, 5—7 mm long, pubescent. Petals shortly clawed, broad-obovate, crisped-crenulate, 2—2.5 cm in diameter, externally sparsely hirsute. Stamens equalling the ovary; filaments stout, glabrous; anthers not exceeding 3 mm; reduced stamens or staminodes 3—5, small. Ovary red-brown hirsute; style short, more or less glabrous; stigma capitate.

TYPE.—Beccari, *Piante bornensi* 633 (holotype; FI).

DISTRIBUTION.—Malaysia: Borneo: Brunei (Sumadan), British North Borneo [Tampassak R. near Koung; Penibukan (Kinabalu) ridge above Dahobang R.; Kayangeran For. Res. (Lawas); Maiaba], Sarawak (Upper Baram Distr.).

ECOLOGY.—Burbidge found *Bauhinia kockiana* in Borneo as a "climbing tree, attaining a height of 50—100 feet, twisting around forest trees and falling from their branches in masses of green foliage and scarlet flowers" (cf. Gardens of the Sun, p. 261). The Clemens's noted that "its gay color mass can be seen for miles." In the Upper Baram District it was collected by Moulton (6799) at 1320 m altitude.

LOCAL NAME.—Sindabodan (British North Borneo), odok odok (Brunei).

Stapf when describing *Bauhinia* (= *Phanera*) *burbridgei*, discussed its close affinity to *B. kockiana*. The type of the former (Beccari, *Piante bornensi* 633) at first sight seems distinct from Korthals's type in its red-brown tomentum present on the thick and short petioles and inflorescences, and the shaggy hairy ovary. On closer study of a wide range of specimens these differences are less stable than was expected. A large suite of intermediate specimens links the two, somewhat extreme, types. On the other hand, Burbridge states to have seen no tendrils. Its ovate, large bracts also distinguish variety *burbridgei*. I have hesitated whether to keep "*Bauhinia burbridgei*" as a separate species would be advisable, and would it appear that it has no tendrils I think that it is better treated as a species closely related to *Ph. kockiana* and *Ph. scarlatina* (Backer ex Camm.) de Wit. I suspect, however, that tendrils are present.

41c. Var. *sericeinervia* de Wit, var. nov.

Varietas *Ph. kockianae* foliis parvis nervis subtus semper dense velutino-sericeis, inflorescentiis sericeis, pedicellis ad 2.5 cm longis, receptaculo 16—18 mm longo distincta.

A climbing shrub; tendrils slender, early caducous, coppery silky; young parts coppery silky. Leaves elliptic, 7—8.5 cm long, 3—4 cm wide, entire, long acuminate (tip of the acumen emarginate or split), on the lower surface soon glabrous except on the 3, very prominent, consistently densely silky tomentose nerves; petiole stout, short, less than 1 cm long, densely coppery tomentose; stipules oblong, acutish, up to 5 mm long and about 2 mm wide; sparsely silky pubescent on both surfaces, early caducous. Flowers large, in dense corymbs, on 2.5—3 cm long, silky tomentose pedicels; bracts linear, up to 4 mm long, inside glabrous; bracteoles similar, subulate, in the lower half of the pedicel. Buds ovoid, silky tomentose. Receptacle narrowly tubular, striate, not dilated at the base, 16—18 mm long. Sepals striate, coherent in 2—3, about 6 mm long lobes. Petals broadly elliptic to obovate, 18—21 mm long and 1 cm wide (including the 3 mm long, slender claw), externally sparsely appressedly pubescent in the median zone. Stamens 11 cm long; filaments slender, glabrous; reduced stamens and staminodes about 5, subulate, up to 6 mm long, glabrous. Ovary on a short, densely coppery pubescent stipe and densely pubescent on the margins; style slender, glabrous; stigma peltate, small.

TYPE.—Posthumus 675 (holotype; BO).

DISTRIBUTION.—Malaysia: Sumatra (Djambi, road to Sungai Manau; Camp Selebuku; Road Kuala Belilas-Sungai Berapit).

ECOLOGY.—From low to 180 m altitude, in primary forest. Flowers collected in April (Buwalda 6655) and August (Posthumus 834). The young flowers are light orange-yellow, then the anthers drop and the petals turn red. The type plant grew on sandy loam.

In some respects (the indumentum, the length of the receptacle) this variety is an approach to variety *burbridgei* from which it differs by its much smaller leaves and shorter pedicels. Forbes 3097 (Sumatra) belongs here.

41d. *Var. velutina* de Wit, *var. nov.*

Varietas *Ph. kockianae* foliis inflorescentisque velutinis, distincta. Ex affinitate *var. burbridgei*, differt tamen foliis 5-nerviis latioribus bracteis angustioribus.

A liana; young parts woolly rusty-tomentose. Leaves ovate to broadly elliptic, entire, chartaceous, sub 5-nerved (the inner nerves prominent, the outer slender and anastomosing in the lower half), 11—15 cm long, 6—9 cm wide; base rounded to (shallowly) cordate; top (broadly and) bluntly acuminate; upper surface dull, glabrous, the lower surface shining, rusty-pubescent, very densely so on the nerves, connecting nerves numerous, prominent; petiole thick, 9—15 mm long, rusty-tomentose; stipule not seen. Flowers in flat-topped or depressed, red-brown tomentose corymbs on slender, 4.5 cm long, woolly pubescent pedicels, along a red-brown woolly axis; bracts linear-subulate, 5 mm long, externally pubescent, bracteoles similar, narrower, 3 mm long, just below the middle of the pedicel. Buds globular, acuminate, striped red-brown pubescent. Receptacle narrowly tubular, red-brown pubescent, striate, dilated at the base, about 10 mm long, red-brown pubescent. Sepals coherent in 2—3 lobes, 8 mm long, in particular pubescent at the top. Petals shortly clawed, (ob)ovate, more or less crisped, 19—23 mm long including the 2 mm long claw, externally thinly appressedly hirsute. Fertile stamens 10—12 mm long, early caducous, filaments glabrous; anthers small, very thick, 2 mm long; reduced stamens and staminodes 6—7, up to 3 mm long, glabrous. Ovary on a red-brown pubescent stipe, in lower part and lower half of the margins pubescent, in the upper part glabrous; style slender, glabrous; stigma swollen, peltate.

TYPE.—Hallier 2554 (holotype; BO).

DISTRIBUTION.—Malaysia: Borneo: Sarawak; West Borneo (Mt. Klam-Sungai Djemela).

This variety is, as regards its indumentum and petioles close to variety *burbridgei* from which it differs by its broader, 5-nerved leaves, and narrower bracts.

42. *Phanera lambiana* (Baker f.) de Wit, *comb. nov.*

Bauhinia lambiana E. G. Baker in *J. Bot., Lond.* 76: 19. 1938.

A climber (tendrils not seen). Leaves lanceolate or narrowly oblong, entire, thickly coriaceous (when dry, margins revolute), 3—5-nerved (midrib distinctly the strongest), the lateral nerves soon fading (transversal nerves not evident), 15—26 cm long, 3—5(—6.5) cm wide; base

cordate to truncate; top tapering; entirely glabrous; petiole thick, 15—18 mm long, glabrous; stipules not seen. Flowers in corymbose, minutely red-puberulous racemes, on up to 5 cm long, slender, puberulous pedicels (axis and pedicels glabrescent); bracts and bracteoles red-rusty puberulous, the former not seen, the latter subopposite, in the lower fourth of the pedicel, subulate, 3 mm long. Buds globose, apiculate, finely puberulous. Receptacle striate, narrowly tubular, about 16 mm long, finely puberulous. Sepals coherent in 2—3 ovate, acute, 7 mm long lobes, which have a red-puberulous area inside near the insertion. Petals broadly ovate, abruptly clawed, about 2 cm long (including the 2—3 mm long claw), externally appressedly sparsely red puberulous (slightly denser so in the median zone). Stamens 10—12 mm long, early caducous; filaments glabrous; anthers broadly elliptic, 2 mm long; reduced stamens and staminodes 4—6, half as long as the fertile stamens. Ovary glabrous except for a coppery pubescence on the upper part of the stipe and on the lower half of the dorsal suture, 6—7-ovulate; style short, slender, glabrous; stigma small, peltate, swollen.

TYPE.—Haviland & Hose 2029 (holotype; BM).

DISTRIBUTION.—Malaysia: Borneo (Mt. Lambia).

ECOLOGY.—Only the type is known; it flowered in May, at about 330 m altitude.

The peculiar leaves distinguish it at first sight from its near ally, *Ph. kockiana* (Korth.) Benth., and from all other *Phaneras*.

43. *Phanera scarlatina* (Baeker ex Camm.) de Wit, *comb. nov.*

Bauhinia scarlatina Baeker ex Cammerloher in: *Bulet. Fac. Stiinte din Cernauti* 3: 171-174 *pl.* 1929.

A straggling shrub or liana, without tendrils; young parts rusty pubescent or red-brown tomentose; branchlets silky rusty tomentose, later glabrescent. Leaves oblong, ovate, elliptic or oblong-obovate, entire, (sub)coriaceous, 5-nerved (the outer pair much slenderer), 10—20 cm long, 4—7.5 cm broad; base acute to subcordate; top acute to long acuminate; nerves distinctly sunk on the shining upper surface, very prominent and rusty tomentose on the woolly pubescent, more or less dull lower surface, connected by numerous prominent perpendicular side-nerves; petiole up to 1 cm long, thick, base and top not incrassate, rusty pubescent, glabrescent; stipules linear, falcate twisting, acute, 1 cm long, externally puberulous, early caducous. Flowers in compound (sometimes simple) lax corymbs at the end of the branches, on slender, 6—8 cm long, rusty-puberulous pedicels; bracts linear, tapering to a long point, 6—7 mm long, appressedly rusty puberulous; bracteoles smaller, placed far below the middle of the pedicel. Buds ovoid, ribbed, acute, rusty-pubescent. Receptacle narrowly tubular, 16—20 mm long, more or less dilated at the base, rusty-pubescent. Sepals coherent in 3 ovate, more or less acute lobes, 10—12 mm long. Petals obovate, not or shortly (about 2 mm long) clawed,

margins crisped, 2.8—3.4 cm long and about 1.7 cm wide, externally appressedly rusty pubescent. Stamens 3 fertile; filaments 7—8 mm long, glabrous; anthers broad and short, about 2.5 mm long, opening by a central pore; reduced stamens 4, slender, $\frac{2}{3}$ — $\frac{1}{2}$ as long; staminodes not seen. Ovary short-stiped, hirsute on stipe and sutures; style short, with a rim of pubescent hairs; stigma peltate, thick, swollen.

TYPE.—Jaheri 1181, Expedition Nieuwenhuis (holotype; BO).

DISTRIBUTION.—Borneo (Mt. Sinkadiang).

ECOLOGY.—Cammerloher studied in 1923 the pollination of the yellow to brilliant scarlet flowers. The three fertile stamens belong to the outer whorl and are curved upwards. The pollen escape suspended in a drop of moisture from the theca by the central pore. This liquid is colourless, very viscous, dries not or very slowly in the air and appears to contain no sugar. Ants are strongly attracted by these drops but Cammerloher suspects that birds or butterflies actually effect pollination. The receptacle is filled to overflowing with honey. The stigma is shining with moisture in the closed bud. There are no records but I think that this exceptional manner of pollen release occurs in more, if not all, species of the subgenus *Biporina*. — At Bogor, in the Botanic Garden, the species was in flower in September to October. The stamens are shed before the flower withers and sometimes 2 fertile stamens are present instead of 3.

Backer proposed the epithet in manuscript and as Cammerloher used it in connection with his above-mentioned study in which he gave a detailed description of the flowers, the name is validly published by the second author.

When dry the leaves have on the upper surface a silvery sheen.

The type was collected at Sungei Ikang (Borneo). The species is cultivated at Bogor and is a straggler of exceptional beauty. It is obviously related to *Ph. kockiana* (Korth.) Benth. and *Ph. finlaysoniana* Grah. ex Benth. but different e.g. in its narrow, acute stipules and the absence of tendrils (which are correlated characters in Bauhinieae). Teysmann is the discoverer of this species, having collected it first (BO).

Subgenus 3. *Austrocercis* de Wit, *subgen. nov.*

Subgenus generis *Phanerae* foliis integris sive emarginatis, floribus pseudo-papilionaceis, receptaculo lato, brevi, antheris fertilibus parvis, latis, longitudinaliter dehiscentibus, emergentio carnoso, digitato, ad basin vexilli posito, distinctum.

Leaves entire or emarginate. Flowers pseudo-papilionaceous, the lower lateral petals directed forwards and more or less facing each other, the upper lateral petals recurved, perpendicular, the standard (inner and uppermost petal) directed upwards and half-recurved. Sepals valvate, coherent in two lobes (calyx bilabiate), the posterior lobe reflexed. Anthers short, broad, splitting lengthwise. Two anterior staminodes minute, free,

placed between the fertile (anterior) stamens, the posterior staminodes represented by a digitate, fleshy body at the base of the vexillum.

TYPE SPECIES.—*Phanera williamsii* (F. Muell.) de Wit.

DISTRIBUTION.—Malaysia: South-eastern New Guinea.

The floral and foliar characters of this new subgenus resemble to some extent those of *Cercis* L., and so the taxon might be taken as a counterpart to *Cercis* on the southern hemisphere. On the other hand, there are so many points in favour of its being placed into *Phanera* (e.g. the ovarial stipe being connate with the anterior wall of the receptacle, the presence of tendrils, three fertile stamens) that it is better not adopted as a distinct genus.

So far a single species, *Phanera williamsii*, is known. It is the ultimate outlier of the genus *Phanera* towards the east.

44. *Phanera williamsii* (F. Muell.) de Wit, *comb. nov.*—Fig. 29

Bauhinia williamsii F. Muell., Descr. Papuan Pl. 4: 61. Dec. 1876; F. M. Bailey in Queenst. agric. J. 24: 21. 1910.

A climber; tendrils slender, paired, nearly glabrous; branchlets smooth, glabrous. Leaves very broadly ovate, often broader than long, entire or very shortly bifid, 5—7-nerved (nerves slender), 5—10 cm across; base cordate to truncate; upper surface shining, when young appressedly whitish hirsute, soon glabrous, lower sparsely appressedly puberulous, not denser so on the nerves, finally glabrous, petiole 4—5(—8) cm long, slender, glabrescent; stipules oblong, acute, 3—4 mm long, sparsely puberulous. Flowers rather small, pseudo-papilionaceous, forming compound, dense, 8—13 cm long, brown-silky racemes, on 6—12 mm long, silky pedicels; bracts linear-subulate, recurved, 2—3 mm long, bracteoles minute. Buds ovoid, not pointed, brown-silky, limb splitting into 2 lobes (bilabiate), the upper lobe 2- the lower 3-pointed, the upper lobe recurved, the lower straight. Receptacle cup-shaped, ribbed, about 4 mm long, wide, ovary emerging from the front. Petals ovate-spathulate, about 6 mm long, silky outside, thinner hairy inside; claw not very distinct. Stamens 3 (anterior) perfect, between these two minute staminodes, a digitate posterior body possibly representing reduced stamens; filaments of the perfect stamens stout, 7—10 mm long, glabrous; anthers short, broad, opening lengthwise. Ovary brown-silky, on a lateral stipe, swollen, brown-silky, laterally gibbous at base, 4-ovulate, stigma hardly broader than the short, glabrous style, which emerges gradually from the ovary. Pod flat, 5—11 cm long, 3 cm wide, glabrescent; seeds 2—3, about 1.5 cm across.

TYPE.—Goldie s.n., near Port Moresby (holotype, n.v.).

DISTRIBUTION.—Malaysia. South-eastern New Guinea (near Port Moresby; Boku; Laloki R.; Lolorua, Kanosia; E. Division, Kuraudi).

ECOLOGY.—The flowers (February to May, pods in June) are crimson or deep-rose-red; in forests from sea-level to 100 m altitude (Brass 753).

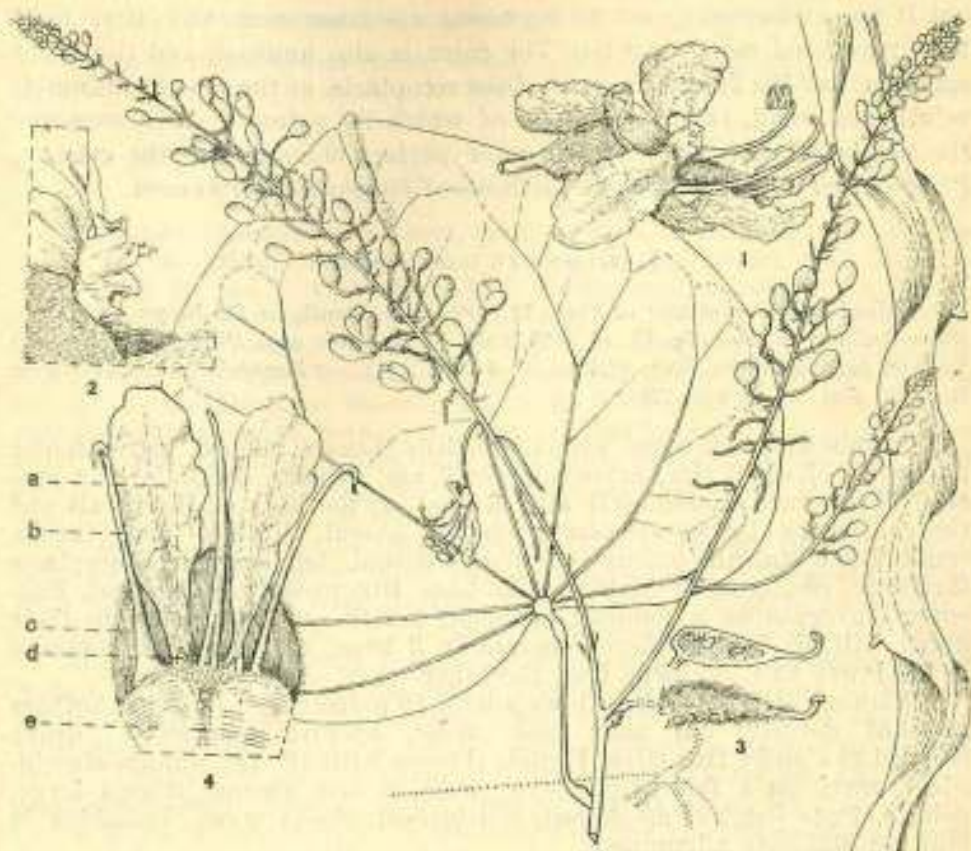


FIG. 29. *Phanera williamsii* (F. Muell.) de Wit: 1, flower, 3 \times ; leaf and inflorescence, stem, nat. size; 2, side-view into flower, showing digitate body, 6 \times ; 3, ovary, 4 \times ; 4, anterior part of flower, 6 \times , a. petal, b. filament, c. sepal, d. staminode, e. ovarial part.

The stems are flattened, nearly 2 cm wide and shaped as a "monkey-ladder." Brass (3590) found it common in rain forest at 450 m altitude; the stem was serpentine or spirally twisted. Brass (1658) collected what appear to be very young shoots, which have the leaves $\frac{1}{4}$ bifid, the top-lobes deltoid, subacuminate. When very young the lower surface of these leaves is deep purple.

LOCAL NAME.—Bata-wasinaka.

F. von Mueller noted that this was closely allied to "*B. scandens* Willd." and said that there was some similarity to "*Phanera rufa*" Benth. from Khasia, but I think they are not closely related. The peculiar, digitate body at the base of the upper petal may represent a number of stamens

but if the excrescences are to represent a stamen each, the latter must have numbered more than ten. The calyx is also unusual, and the ovary emerges near the frontal margin of the receptacle, at the top of a minutely velutinous, small, triangular area, of which its point of emergence and the points of emergence of the outer perfect stamens are the corners. *Phanera williamsii* represents an isolated subgenus in *Phanera*.

PILIOSTIGMA Hochst.

Piliostigma Hochstetter in Flora 29: 598. 1846; Benth. in Pl. Jungh. 261. 1852; Milne-Redhead in Hook. Ic. Pl. pl. 3460. 1947. — *Bauhinia* sect. *Piliostigma* (Hochst.) Taubert in Engl. & Pr. Nat. PflFam. 3, 3: 149. 1891. — *Bauhinia* sect. *Pileostigma* B. & H., Gen. Pl. 1: 576. 1865.

Shrubs or small trees, without tendrils. Leaves bilobed. Intra-stipular trichomes of equal size, extremely small and delicate (in Malaysian species). Trichomes (glandular?) also present on the back of the petals and the connective. Intra-bracteolar trichomes absent. Stipules linear, acute, small. Buds smooth, oblong or oblong-obovoid, top rounded. Receptacle turbinate, small, never dilated at the base. Bracteoles subpersistent. Racemes aggregate on a common peduncle, rarely solitary. Sepals in their upper half all free or there coherent in 2 lobes, all remaining coherent in the lower half. Stamens free, the inner whorl shorter.

Flowers dioecious. Male flowers with 10 perfect free stamens; anthers attached dorsally but near base, ovoid, opening lengthwise; ovary reduced to a short free stipe. Female flowers with 10 very minute stamens; ovary on a free stipe; style more or less absent; stigma large, peltate. Pods long, strap-shaped, indehiscent. Seeds many, imbedded in pulp, in Malaysia albuminous.

TYPE SPECIES.—*Piliostigma reticulata* (DC.) Hochst. (*Bauhinia reticulata* DC.).

DISTRIBUTION.—South-eastern Asia, Africa. In Malaysia from Central Java eastwards and in the Philippines.

Hochstetter referred only African species to his genus *Piliostigma*. He suggested that several other species belonged to it. In the two African species the intra-stipular trichomes are larger than in the Asiatic and approach in appearance to those of *Bauhinia*.

Milne-Redhead's revision of *Piliostigma* (*l.c.*) came to hand when my present study of the Bauhinieae of Malaysia had been finished. I am in agreement with his conclusions. He makes no comment on the tubulo-turbinate calyx, which is split only in the upper half. I think that this character is of importance.

As a generic name *Elayune* Raf. has priority over *Piliostigma* Hochst.; the latter name is recommended for conservation.

PILIOSTIGMA MALABARICUM (Roxb.) Benth.

Pilostigma malabaricum (Roxb.) Benth. in Miq., Pl. Jungh. 261, 1852. — *Bauhinia malabarica* Roxb., Hort. beng. 31, 1814, nomen nudum; Fl. ind., ed. Carey, 321, 1832.

Var. acidum (Korth.) de Wit, stat. nov.—Fig. 30

Bauhinia malabarica Roxb., Hort. beng. 31, 1814, nomen nudum; Fl. ind., ed. Carey, 321 1832; Wight & Arn., Prodr. Fl. Pen. Ind. or. 294-295, 1834; Baker in Hook. f., Fl. Br. Ind. 2: 277, 1878; F. Vill., Noviss. App. 72, 1880; Vidal, Cat. Pl. Prov. Manila 27, 1886; Rev. Pl. vasc. Filip. 117, 1886; Koord. & Val., Bijd. Booms. Java 2: 24, 1895; Perkins, Fragn. Pl. Philipp. 1: 8, 1904; Merr. in Philipp. J. Sci. (Bot.) 5: 43, 1910; Spec. Blancoan. 172, 1913; Backer, Schooffl. 416, 1911; Koord., Exk. Fl. 2: 365, 1912; Atlas Baumart. Java 1 (1): f. 13, 1913; Heyne, Nutt. Pl. Ned. Ind. 737, 1927; Oehse [& Bakh. v. d. Brink Sr.], Ind. Groenten 368, 1931; Backer, Bekn. Fl. Java, Nooduitg., 5 (Fam. 118); 21-22, 1941; Milne-Redhead in Hook. Ic. Pl. pl. 3469 p. 2, 1947; Quisumbing, Med. Pl. Philipp. 367, 1951; Meijer Drees in Comm. For. Res. Inst., Bogor No. 33: 68, 1951.

Bauhinia acida Reinw. ex Korth, Verh. Nat. Gesch., Bot. 86, 1841. — *Bauhinia purpurea* (non L.) DC., Prodr. 2: 515, 1825, quoad spec. timor. — *Bauhinia (Pauletia) acida* (Reinw. ex Korth.) Hassk. in Flora 31: 578, 1848. — *Bauhinia purpurea* (non L.) Vidal, Sin. Atlas 24 pl. 53 f. A, 1883. — *Bauhinia tomentosa* (non L.) Blanco, Fl. Filip. 330, 1837; Ed. 2: 220, 1845; Ed. 3: 65 pl. 118, 1878 (sub *Pilostigma acidum* Benth.). — *Bauhinia castrata* Hasskarl in Flora 25 (Beibl.): 96, 1842. — *Bauhinia platyphylla* Zip. ex Miq., Fl. Ind. bat. 1 (1): 73, 1855. — *Bauhinia hawkesiana* F. M. Bailey in Queensl. agr. J. 15: 897, 1905. — *Bauhinia rugulosa* Bl. ex Miq., Fl. Ind. bat. 1 (1): 73, 1855. — *Casparca castrata* Hassk., Pl. jav. rar. 412, 1848. — *Pilostigma acidum* (Reinw. ex Korth.) Benth. in Miq., Pl. Jungh. 261, 1852; A. Gray in Bot. Wilkes U.S. Expl. Exp. 470, 1954. — *Pilostigma malabaricum* (Roxb.) Benth. in Miq., Pl. Jungh. 261, 1852.

A 4—17 m tall, low-branching tree; branchlets glabrescent. Leaves $\frac{1}{4}$ — $\frac{1}{2}$ bifid, (sinus wide), (7—)9—11-nerved (and a distinct marginal nerve), 5—12 cm long, 8—16 cm wide; base rounded to subcordate; toplobes broadly rounded; both surfaces dim, upper light green to subglaucous and sparsely pubescent; petiole 2—4 cm long, grooved, ad first densely pubescent; stipules linear-acute, 2—3 mm long, outside densely pubescent, inside glabrous, very early caducous. Intrastipular trichomes few, extremely delicate and small. Racemes few cm long on short branchlets, dense, single or aggregate on a common peduncle, flowers on filiform, 1—3 cm pedicels; bracts squamiform, minute, hairy, obtuse, about 1 mm long, subpersistent; bracteoles subopposite, similar, at or near base of receptacle. Buds rounded, oblong, smooth, densely pubescent. Receptacle evident, 2—5 mm long. Sepals coherent in the lower half and free in the upper or there coherent in 2—3 lobes, the whole 15—18 mm long. Petals oblong, not clawed, up to 2 cm long, on the back with areas studded with narrow-elliptic excrescences which carry on top usually stiff hairs. Male flowers with rudimentary ovary and stipe, 10 stamens alternating long and short;

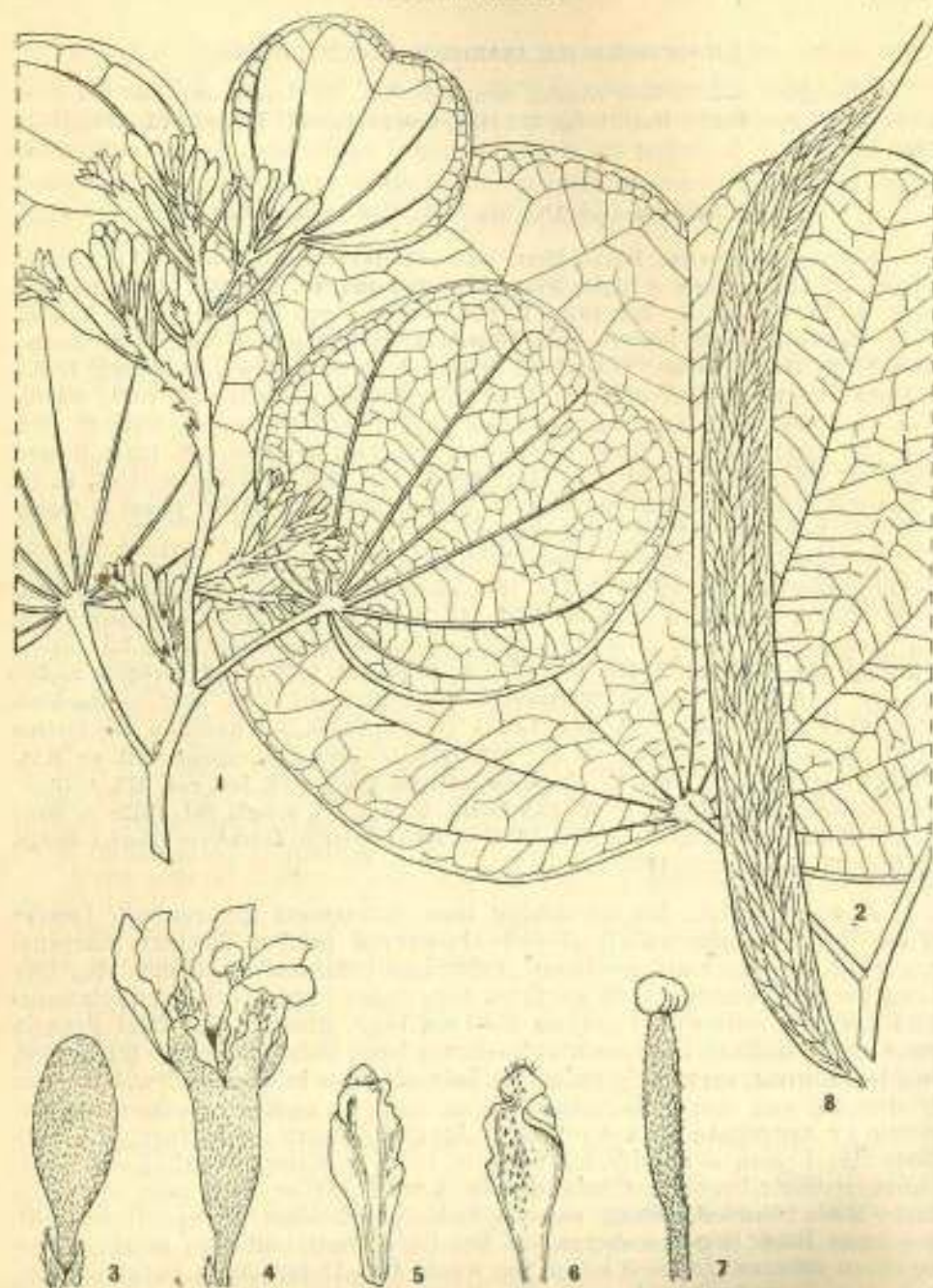


FIG. 30. *Ptilostigma malabaricum* var. *acutum* (Korth.) de Wit: 1, inflorescence and leaves, $\frac{1}{2} \times$; 2, leaf, $\frac{1}{2} \times$; 3, bad, $3\frac{1}{2} \times$; 4, female flower, $2\frac{1}{2} \times$; 5 and 6, petals, $2\frac{1}{2} \times$; 7, ovary, $2\frac{1}{2} \times$; 8, pod, $\frac{1}{2} \times$.

filaments free, glabrous, but at their base with a tuft of pubescent hairs; anthers on back of connective and on top with excrescences like those of the petals, opening by a length-slit. Female flowers with densely tomentose ovary on free stipe, 10 minute staminodes present among the hairs on mouth of receptacle; stigma broad, lobed, swollen-peltate. Pods strap-shaped, often bent, rather thick, not dehiscent, 20—25 cm long and 2—3 cm wide; valves rugulose, finally glabrous. Seeds 10—30, rounded-oblong, dark brown, albuminous, not notched at hilum.

TYPE.—Reinwardt *s.n.*, L 908.112-109 (holotype of the variety *acidum*).

DISTRIBUTION.—India, Siam, Cochinchina. In Malaysia (only the variety *acidum*): Philippines: Luzon (Ilocos Norte to Laguna), Rizal; Java (E of Purwakarta), Madura, Sumbawa, Sumba, Wawuwiti (near Flores), Timor, Wetar.

LOCAL NAMES.—Philippines: bambang (with prefixes alam-, ali-, bali-, kali- in the various languages); Indonesia: kandakajan (Sundanese), kenda(ja)an, pontjollok (Javanese), tjampalok (Madurese), rarukamba (Sumba), kri(p)pi, rufe (Sumbawa), masi (Timor), kalikeng or njanjitu (Flores); Malabar: baubinia (English).

ECOLOGY.—In the Philippines it is "very abundant on dry hills in parts of Rizal and Laguna" (Merrill). It reaches a height of 8—10 m; the bark is yellowish-brown, checked (Quisumbing). — A. Valenciano found it (Los Baños, Laguna Prov.) fire resistant and "a good tree to drive out cogon grass." — On Java it occurs on soils subject to a long, dry season, to 400 m altitude, often on lime soils. It is very common in teak forests and, generally, in open, deciduous forests; it occurs never in dense, evergreen forests. It grows also in open savannahs, in "bambuduri" forests, also on seasonally marshy soils. It is locally frequent but always scattered and never the dominant species. In Timor it is found to 600 m altitude. Dammerman (*in Nat. Tijdschr. Ned. Ind.* 86: 43. 1926) found three tree species characteristic of the open grassy plains of Sumba, one of them *P. malabaricum*, which suggested by its shape a lime tree having a round, closed crown. Elbert found the species on Sumbawa on calcareous soils. — The leaves in seedlings are not different from leaves in adult plants (Van der Pijl, MS.). — The flowers are described as yellow or white. Langlassé noted at San Matignon (Philippines) in Dec. 1894: "fleur jaunâtre striée de noir." They drop easily and are comparatively rarely found fully developed in herbarium specimens. — The sepals never become further apart than halfway down to the receptacle. They are, in the upper part, free and appear like 5 teeth or remain there coherent in 2 lobes. This dimorphism may be connected with the sexual nature of the flowers but I have not been able to demonstrate that the shape of the calyx was correlated with the sex of the flower.

USES.—Used for charcoal; the bark for twining as it contains 9.5% tannin. An infusion of the fresh flowers is said to be antidiarrhetic. On Timor the pounded bark as a poultice on wounds. Young leaves taste sour and are eaten fresh with rice, also added when cooking food or chewed to quench thirst. They are "an excellent source of calcium and a very

good source of iron" (Quisumbing, *l.c.*). Planted in afforestation experiments on very poor soils in association with *Swietenia*, *Pterocarpus*, and *Cassia siamea* (Semarang).

The Indonesian specimens form a distinct variety, differing from the variety *malabaricum*, in which the leaves are as a rule entirely glabrous, by a pubescent lower leaf-surface especially on the nerves, and by sour-tasting shoots [cf. also Prain in *J. As. Soc. Bengal* 66 (2) : 495. 1897]. The specimens from South Siam, however, closely resemble those of Malaysia, though they are decidedly less hairy, and here again becomes apparent a striking similarity between Siamese specimens of *Bauhinia* and eastern Malaysian (cf. *Bauhinia acuminata*, L., *B. hirsuta* Weinm., *B. viridescens* Desv., *Phanera finlaysoniana* var. *javanica*, and *Ph. finlaysonianus*, etc.).

Another difference (see also below) may be the shedding of the leaves. *Phanera malabaricum* var. *acidum* is in the dry season nearly bare (cf. Volkens, Laubf. & Laubern. Trop. 28. 1912) but I found no evidence of a similar leaf-shedding in the variety *malabaricum*. Kurz (For. Fl. Br. Burma 1: 399. 1877) described the latter as "an evergreen tree," and "frequent in the upper and lower mixed forests of the Pegu Yomah, rarely entering the savannah forest," whereas in Indonesia the variety *acidum* is generally a characteristic tree of the savannah and open forests.

Bauhinia acida Reinw. ex Korth. is synonymous with *Bauhinia purpurea* L. *sensu* De Candolle, which was pointed out by Korthals when he published the name (*l.c.*). This was confirmed by Hasskarl (*l.c.*) when he published "*B. (Pavletia) acida* Reinw." Baker also was of the same opinion. I found that the authentic specimens examined by De Candolle, Korthals, and Hasskarl are all referable to *Ptilostigma malabaricum* var. *acidum*.

The names *Bauhinia castrata* Blanco and the homonym *B. (Casperea) castrata* Hasskarl are based on female-flowered *Ph. malabaricum*, the former probably also on *B. purpurea* L. (see there).

Roxburgh (Fl. ind., Ed. Clarke, 2: 345. 1874) said it was "remarkable for the regularity of its five-parted calyx." Corner (Ways. Tr. Mal. 380. 1940) refers to an "unsplit calyx" and a "calyx with 5 teeth, not splitting open." Actually, the calyx splits in Malaysian specimens in the upper part into two lobes, one consisting of two sepal-tops and the other of three. In some cases the five tops become free. It is just possible that in India the tops of the sepals become always free and that this is connected with the flowers being male, which is confirmed by a few specimens from

India which I was able to examine. I note that Wight & Arnott state that they never saw a pod on the species.

The young shoots of the Indian plants are "very acrid" or "slightly bitter" (cf. Watt, Diet. econ. Prod. India 1: 421. 1889) but I find no reference to the acid or sour taste so much appreciated in the Indonesian specimens, which makes it a generally favoured native side-dish.

The differences in hairiness of the leaf, in taste, and in life-habits, described above, characterize the variety *acidum*.

SPECIES EXCLUDENDAE VEL REJICIENDAE

BAUHINIA BRACTEATA (Grah. ex Benth.) Baker

Bauhinia bracteata (Graham ex Bentham) Baker in Hook. f., Fl. Br. Ind. 2: 282. 1878; Ridley, Fl. Mal. Pen. 1: 634. 1922.

Ridley stated that *B. bracteata* (*Phanera bracteata* Grah. ex Benth.) occurred in the Malay Peninsula. This record rests on an erroneous identification. I was able to examine the type of *Ph. bracteata* (Wall., Cat. No. 5802) and found that it is first of all characterized by a produced, tubular mouth of the receptacle. Ridley's specimens are *Ph. bassacensis* (Pierre ex Gagnep.) de Wit (see there).

BAUHINIA CUCULLATA Desv.

Bauhinia cucullata Desvaux in J. Bot., ed. Desv., 3: 74. 1814; Zollinger in Nat. geneesk. Arch. Neerl. Ind. 3: 69. 1846.

When Desvaux described *B. cucullata* he gave as country of origin "Ind. Or." No evidence being procurable as to Desvaux's delimitation of "India Orientalis," the possibility that *B. cucullata* originated from Malaysia was luckily discarded when the author himself in a renewed treatment (in Ann. Sci. nat. 9: 429. 1826) stated its habitat to be: "in America calidiore nec in Indiis orientalibus."

BAUHINIA DIPHYLLA Ham.

Bauhinia diphylla Ham. in Symes, Acc. Embassy Ava, 2nd Ed., 3: 311. 1811.

The "Index kewensis" refers this to "Burma, Malaya." It is, however, an Indian species; the specimens referred to it by Baker (in Hook. f., Fl. Br. Ind. 2: 278. 1878) belonged to two other species (cf. Ridley, Fl. Mal. Pen. 1: 634. 1922).

BAUHINIA ELONGATA "Kunth"

"*Bauhinia elongata* Kunth": Merr., Enum. Philipp. fl. Pl. 2: 261. 1923.

A misprint for *B. elongata* Korth. (cf. F.-Vill., Noviss. App. 73. 1880).

BAUHINIA INDICA Lodd. ex Loud.

Bauhinia indica Loddiges ex Loud., Hort. brit. 165. 1830.

Native of "Ind. Or."; a nomen semi-nudum, to be rejected.

BAUHINIA INERMIS Perr.

Bauhinia inermis Perrottet in Mém. Soc. lin. Paris 3: 102. 1824.

A twice preceded homonym. Described as "a species from the Philippine mountains" and to be rejected as a nomen nudum.

BAUHINIA KHASIANA Bak.

Bauhinia khasiana Baker in Hook. f., Fl. Br. Ind. 2: 281. 1878.

Fernandez-Villar (Noviss. App. 73. 1880) recorded this for the Philippines, but was probably mistaken.

BAUHINIA LATISILIQUA Cav.

Bauhinia latisiliqua Cavanilles, Ic. 5: 5 pl. 407. 1799.

"Rests on a specimen from the Philippines described in Herb. Née, and proposed as a distinct section *Mesoptera* by Korthals. It is unknown to the botanists of the present. To me the figure and description suggests a spurious species, composed by the leaves of *Bauhinia* and the fruit of *Mesoneron* (Bentham in B. & H., Gen. Pl. 1: 576. 1865). This was confirmed by Merrill (Enum. Philipp. fl. Pl. 2: 261. 1923; cf. also F.-Vill., Noviss. App. 73. 1880 and Vidal, Phan. Cuming. Philipp. 117. 1886).

BAUHINIA LUNARIA Cav.

Bauhinia lunaria Cavanilles, Ic. 5: 4 pl. 407. 1799.

Fernandez-Villar (Noviss. App. 73. 1880) ascribed this to the Philippines, in accordance with Cavanilles's data. De Candolle (Prodr. 2: 512. 1825) and Vidal (Rev. Pl. Vasc. Filip. 117. 1886) followed this, but Merrill (Enum. Philipp. fl. Pl. 2: 261. 1923) pointed out that Cavanilles had his species erroneously localized.

BAUHINIA PARVIFOLIA Teysm. & Binnend.

Bauhinia parvifolia Teysmann & Binnendijk in Nat. Tijdschr. Ned. Ind. 29: 257. 1867 (non Field & Gardn., nec Seem.).

When *B. parvifolia* was published by Teysmann & Binnendijk, the name was twice preoccupied (*B. parvifolia* Hochst. ex Field & Gardn. in Sert. Bot. pl. 10. 1844, and *B. parvifolia* Seem. in Bot. Voy. Herald 113. 1852). Baker (in Hook., Fl. Br. India 2: 232. 1878) adopted Teysmann & Binnendijk's binomium as the basonym of *Bauhinia* (= *Phanera*) *glauca* var. *parvifolia*.

Teymann & Binnendijk stated that they received the plant from Oxley (Singapore) and that it was said to be native of China.

Specimens preserved at Bogor may be regarded as authentic. They are flowerless and represent, I believe, *B. racemosa* Lam.

I did not come across a distinct, small-leaved variety in *Phanera glauca* among the Malaysian specimens.

BAUHINIA "PAUCIFLORA" Vahl

Bauhinia pauciflora Vahl was referred to by Spanoghe (in Linnaea 15: 202. 1841). Vahl never published this binomium and it seems that Spanoghe wished to refer to *Bauhinia parviflora* Vahl (Symb. 3: 55. 1794), an extra-Malaysian species. Possibly the mistake is due to a misprint. The name of Merrill's *B. pauciflora* published in 1915 (see under *Ph. pauciflora*) is to be maintained.

BAUHINIA MEGALANDRA Griseb.

Bauhinia megalandra Grisebach, Fl. Brit. W. Indian Is. 213. 1864.

This species was cultivated at Singapore. It is somewhat alike *Ph. pottsii* but has 10 fertile stamens and larger flowers (in 1—3-flowered inflorescences) and the petals are white and very narrow. So far I have seen no specimens cultivated beyond the limits of the Singapore Botanic Gardens.

LOCAL NAME.—West Indian bauhinia.

Corner (Ways. Trees Mal. 380. 1940) says "it is little known in Malaysia, not beautiful."

BAUHINIA RACEMOSA Lam.

Bauhinia racemosa Lamarek, Encycl. méth. 1: 390. 1783 (non Vahl).

Baker (in Hook. f., Fl. Br. Ind. 2: 276. 1878) believed that *B. timorana* Decaisne (Nouv. Ann. Mus. Paris 3: 466. 1834) was identical with

B. racemosa Lam. For this reason he assigned the latter to the "Malay Isles," as *B. timorana* had been reported to occur there. This was also entered in Index kewensis. Baker changed the name *B. timorana* into *B. timoriensis* (cf. *B. viridescens*).

Bauhinia racemosa is not indigenous in Malaysia. It is immediately distinguishable from the Malaysian species by its straight, open, small racemes, 10 short stamens bearing narrow, 4 mm long, anthers, which are hairy and split lengthwise. It is native to north-east India [see also Prain in J. As. Soc. Bengal 66 (2) : 495. 1897].

BAUHINIA RETUSA Ham. ex Roxb.

Bauhinia retusa Ham. ex Roxburg (Hort. beng. 31. 1814) : Fl. ind., Ed. Carey 2: 322. 1832; DC., Prodr. 2: 515. 1825; Baker in Hook. f., Fl. Br. Ind. 2: 279. 1878. — *Phanera retusa* Benth. in Pl. Jungh. 263. 1852; Miquel, Fl. Ind. bat. 1 (1) : 64. 1855.

An Indian species [= *Lasiobema retusum* (Roxb.) de Wit, *comb. nov.*] ascribed to Luzon by Fernandez-Villar (Nov. App. 72. 18880) but in error (Merr., Enum. Philipp. fl. Pl. 2: 262. 1923).

BAUHINIA RUFa Grah. ex Baker

Bauhinia rufa Graham ex Baker in Hook. f., Fl. Br. Ind. 2: 280. 1878. — *Phanera rufa* Benth. in Pl. Jungh. 263. 1852.

An Indian species ascribed to the Philippines by Fernandez-Villar (Noviss. App. 72. 18880) but in error, compare Merrill (Enum. Philipp. fl. Pl. 2: 262. 1923). The name is preoccupied.

BAUHINIA "STENOSCYPHA" Baker f.; Ind. Kew., Suppl. 2: 24. 1904.

Bauhinia stenostachya Baker f. in Kew Bull. 1896: 22.

This is an error in Index kewensis; it was intended to refer to *Bauhinia stenostachya* (l.c.) = *Phanera semibifida* var. *stenostachya* (Baker f.) de Wit.

BAUHINIA SUBROTUNDIFOLIA Cav.

Bauhinia subrotundifolia Cavanilles, Ic. 5: 4 pl. 406. 1799; DC., Prodr. 2: 512. 1825; Naves in Blanco, Fl. Filip., Ed. 3, pl. 82. 1877; F.-Vill., Noviss. App. 72. 1880; Vidal, Rev. Pl. Vasc. Filip. 117. 1886.

Erroneously localized and subsequently ascribed to the Philippines by various authors; compare Merrill (Enum. Philipp. fl. Pl. 2: 262. 1923).

BAUHINIA SULPHUREA C. E. C. Fischer

Bauhinia sulphurea C. E. C. Fischer in Kew Bull. 1927: 85.

Fischer described *B. sulphurea* for Tenasserim (holotype: C. E. Parkinson no. 1918). Craib (Fl. siam. Enum. 1: 530. 1928) identified specimens from Surat and Puket with this species and it would occur, therefore, in Malaysia also. I have seen the specimens identified by Craib and the paratype of *B. sulphurea* (Fischer 1951; K).

Bauhinia sulphurea Fischer undoubtedly belongs in subsection *Chlorozantheae* and is probably a good species. I am unable to follow Craib in referring the cited specimens to *B. sulphurea* and place them with *Phanera bassacensis* (Pierre ex Gagnep.) de Wit.