

NOTES ON TROPICAL AMERICAN BIGNONIACEAE

by

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I. Notes on Guiana Bignoniaceae.

The following notes have been written during the preparation of the account of the *Bignoniaceae* for Pulle's Flora of Suriname, and deal with the more important identifications and name-changes which have been made while the work was in progress. Previous studies on the Guiana representatives of this family appeared in the Kew Bulletin for 1932, pp. 18-28; 81-93. The Suriname material in the Herbaria of Utrecht, Leyden, Brussels and Göttingen has been sent on loan to Kew, and the writer has had the opportunity of studying the whole of the Tropical American *Bignoniaceae* at Kew, the British Museum, Paris and Geneva; while other specimens have been lent by the Herbaria of Berlin-Dahlem, Munich, Uppsala and Copenhagen.

To the authorities of all these institutions he wishes to tender his best thanks; while he is especially indebted to Mr. J. Bausch, of Holland, for his kindness in preparing a number of slides of pollen-grains.

Bignonia incarnata Aubl. Pl. Guian. 645, t. 261, t. 262 ff. 1—8 (1775); Lam. Encycl. i. 420 (1785); Vitm. Summa Pl. iii. 509 (1789); Spreng. Syst. Veg. ii. 831 (1825); Splitgerber in Tijdschr. Nat. Geschied. en Phys. ix. 7 (1842), quoad nomen tantum, excl. descr.; Miq. in Flora, xxv. 2, p. 426 (1842), quoad nomen tantum; Miq. in Linnaea, xviii. 259 (1844), nomen; DC. Prodr. ix. 154 (1845), quoad nomen tantum; Baill. Hist. Plantes, x. 31 (1891), in syn. in obs.; K. Schum. in Engl. Pflanzenfam. iv. 3B, 224 (1894); Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 247 (1897), in syn. et in obs. — *Cydista incarnata* (Aubl.) Miers in Proc. Royal Hort. Soc. iii. 192 (1863); Bur. et K. Schum., l.c., in syn.

The identification of this name was a source of difficulty to the older botanists, but it gradually became associated with the well-

known *Cydista aequinoctialis* (L.) Miers, at first only tentatively by Miquel and de Candolle, then quite definitely by Baillon and Schumann, and finally with misgivings by Bureau and Schumann in the *Flora Brasiliensis*. The reason for these misgivings is only too obvious when Aublet's description and figures are examined. The presence of a large conspicuous disk, the small corolla-limb in relation to the tube, and the thin membranous wings of the seeds, are characters which should at once preclude even so much as a suggestion of the possibility of Aublet's species being conspecific with *Cydista aequinoctialis*. The trouble arose because Splitgerber and Miquel arbitrarily identified their material (coll. Splitgerber!, Focke!) of *C. aequinoctialis* with *Bignonia incarnata* Aubl. and proceeded to give emended descriptions of their own which ignored the difficulty of Aublet's disk, added the character of tetragonous branchlets, and completely altered the description of the seeds!

Is it possible to identify Aublet's *Bignonia incarnata* with any other species? There is a specimen of Aublet's collecting in the Herbarium of the British Museum on which this name has been written, and which was also taken as the type of the species by Miers when he transferred *B. incarnata* to the genus *Cydista*. The specimen undoubtedly represents a species of *Clytostoma*, and almost certainly *C. binatum* (Thunb.) Sandwith (*C. noterophilum* (DC.) Bur. et K. Schum.), which is frequent in Guiana and the only species of the genus occurring there. In the light of this evidence it will now be agreed that Aublet's t. 261 does indeed closely resemble *Clytostoma binatum* in characters of the pseudostipules, shape and venation of leaflets, calyx and corolla; and, in fact, the Aublet specimen at the British Museum agrees quite well with this plate. Unfortunately, however, we have to consider the whole of Aublet's description, and also the figures of the flower, fruit and seeds on t. 262. The disk of *Bignonia incarnata* is much too large and pulvinate for a species of *Clytostoma*, in which the disk is short, shallow and platter-shaped; while the fruit and seeds are utterly different from those of *Clytostoma*. *B. incarnata* Aubl. can therefore be applied neither to a species of *Cydista* nor to one of *Clytostoma*, whether one considers separately the vital element of the flower or that of the fruit; on the other hand, we may feel fairly confident that Aublet had a specimen of *Clytostoma binatum* before him when he prepared his description and plates. It is almost certain that we are faced with one of Aublet's numerous descriptions which are compounded from discordant elements, and in this particular

instance we shall be more than usually justified in treating his name *Bignonia incarnata* as a *nomen dubium*.

Bignonia moringifolia DC. Prodr. ix. 170 (1845); Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 275 (1897), in syn. — *Pleonotoma moringaefolia* (DC.) Miers in Proc. Royal Hort. Soc. iii. 184 (1863).

This species was unknown to Schumann who placed it, with doubt, in the synonymy of *Pleonotoma variabilis* (Jacq.) Miers. The type specimen, from French Guiana, has been discovered in the Paris Herbarium among the sheets of *Bignonia* (*Pleonotoma*) *jasminifolia* H.B.K. The branchlets, instead of being angled and ribbed as in *Pleonotoma*, are subterete and lenticellate. The leaflets are very small, resembling those of *Jacaranda rhombifolia*, the largest (terminal) being 1.6 cm. long and 0.7 cm. broad. The capsule is brown and glabrous, with the midrib impressed and scarcely visible; while the seeds have membranous wings. The plant has not been matched with any other collection, but it is apparently a species of *Memora*, and the following new combination is therefore proposed: *Memora moringifolia* (DC.) Sandwith, comb. nov.

Bignonia pilulifera L. C. Rich. in Act. Soc. Hist. Nat. Paris, i. 111 (1792); DC. Prodr. ix. 165 (1845).

The type of this species, collected by Leblond in French Guiana, was not seen in the Paris Herbarium but the specimen cited by de Candolle, viz. *Leblond* (n. 294) in Herb. Deless., is in the general Herbarium of the Conservatoire Botanique at Geneva and agrees with Richard's description. The specimen has been determined by Bureau as *Arrabidaea tuberculata* DC. Examination leads to the conclusion that Bureau's determination is probably correct, but only on the supposition that the specimen represents an untypical example of *A. tuberculata*. The inflorescence is just right for that species, but the leaflets differ widely from those of any material which has been seen. They are more obovate and more shortly cuspidate, coriaceous, shining, glabrous and drying a dark colour on the upper surface with the venation wholly impressed, puberulous along the main nerves beneath, otherwise practically glabrous with the ultimate veinlets very intricately reticulate, not barbate in the axils of the main nerves, nor punctate; main lateral nerves about 6 on each side of the midrib. There are no small adpressed hairs to be seen on the areoles of the lower surface, but very minute hairs are scattered along the veinlets.

Even if *B. pilulifera* is eventually proved with certainty to be conspecific with *Arrabidaea tuberculata*, Richard's epithet is to be rejected under the international rules of botanical nomenclature, since it is based on a monstrosity, viz. the pill-like galls on the inflorescence.

Adenocalymma Mart. ex DC. It has for long been realised that *Adenocalymma*, as emended by Miers in Ann. Nat. Hist. ser. 3, vii. 387 (1861) and as treated by Bureau and Schumann in the Flora Brasiliensis, is a veritable hotch-potch. Certain obviously discordant elements in Bureau and Schumann's treatment have already been removed, e.g. Sect. II. *Pachyptera*, with *A. foveolatum*, to *Pachyptera* DC., and *A. splendens* from Sect. III, *Hanburyophyton*, to *Chodanthus* Hassl. There remains, however, the equally obvious fact that the two surviving sections, *Euadenocalymma* and *Hanburyophyton*, are quite incompatible as constituents of the same genus.

The first of these possesses the characters of *Adenocalymma* as defined by de Candolle in the original description in DC. Prodr. ix. p. 199, and it is therefore proposed that the genus should in future be restricted to this section, the species of which seem to hang well together, with the exception of *A. elegans* (Vell.) Bur., and present the following salient characters: branchlets without gland-fields at the nodes; leaves 2-3-foliolate; tendril simple; bracts conspicuous, but caducous; calyx with conspicuous black plateshaped glands on the outer side; corolla bright yellow, either wholly tomentose or pubescent, very rarely wholly glabrous (*A. impressum*) outside; ovules biseriate in each loculus; capsule oblong or oblong-linear, the valves woody and thick, sometimes almost sausageshaped, usually more or less rugose and warty, the median nerve inconspicuous; seeds either wholly corky or with membranous wings; pollen-grains not sulcate. Within this section is to be found an interesting group of species with a thick, pale, cartilaginous margin to the leaflets, viz. *A. Hintoni* Sandwith (Mexico), and the South American *A. marginatum* (Cham.) DC., *A. inundatum* Mart. ex DC., and *A. impressum* (Rusby) Sandwith; in the last two of these the indumentum of the corolla is more or less evanescent or absent, while the first and the third have a conspicuous connective which is produced beyond the anther thecae.

The species of the section *Hanburyophyton*, on the other hand, are remarkable for the presence of gland-fields at the nodes; leaves 2-foliolate; tendril trifid (always?); bracts inconspicuous, subulate; calyx eglandular, or at any rate without large plate-

shaped glands; corolla lilac or purple, the limb densely pubescent outside when young (cf. *Petastoma*), the tube glabrous outside or merely minutely lepidote when young; ovules biseriate in each loculus; capsule elongate-linear, very compressed, the valves flat and rather thin (cf. *Petastoma*, *Arrabidaea*), smooth, the median nerve conspicuously and quite sharply raised; seeds with broad membranous wings (always?); pollen-grains trisulcate. Some of the species of this section emit the strong smell of garlic which was first noticed in Lamarck's *Bignonia alliacea*, many have the leaflets rather conspicuously 3-nerved at or near the base, while some produce a conspicuous thyrses with strongly flattened rachis.

It is clear that the section *Hanburyophyton* is very closely allied to the genus *Chodanthus* which was segregated from it by Hassler. Most of the salient characters are shared by both, but *Chodanthus* is to be distinguished by the absence of gland-fields at the nodes, by the quadriseriate ovules of each loculus, by the thick, woody, more or less convex valves of the capsule which approaches that of true *Adenocalymma*, and by the esulcate pollen-grains (see Urban in Ber. Deutsch. Bot. Ges. xxxiv. 738).

Another close ally is *Petastoma*, which was suddenly extended by Kraenzlin (Fedde, Repert. Sp. Nov. xvii. 54, sqq.) to cover certain species which should clearly be referred to the section *Hanburyophyton* of *Adenocalymma* sens. Miers et Bur. et K. Schum.; but *Petastoma* lacks the gland-fields at the nodes, its tendrils are simple, the calyx is very distinctive in shape and texture, and the inflorescence is a showy elaborate thyrses. As to *Arrabidaea*, apart from its simple tendril, no botanist would presumably venture further to increase the heterogeneous nature of the large collection of species which bear this name.

What then is to be done with section *Hanburyophyton*? The answer seems to be that a recently (1934-5) described genus is waiting to receive it, namely the *Pseudocalymma* of Sampaio and Kuhlmann (see Bol. Mus. Nac. Rio de Janeiro, x. 99-101, cum tab., and Ann. Acad. Bras. Ciencias, vii. 123-125, with notes on the affinities) which was based on *Adenocalymma laevigatum* Bur. et K. Schum. The latter species was itself a member of the section *Hanburyophyton*, and appears to possess the characters which are peculiar to the other species, while its general facies is certainly in accord with theirs. Dr. Sampaio has given an admirable account of the differences between his new genus and its allies, but at the moment he has placed in it only that species whose rejection from *Adenocalymma* was indicated by

Urban on account of the characters of the tendril and pollen-grains. The present writer sees no reason why several other species presenting the interesting characteristics of *Pseudocalymma* should not be included in it, and he accordingly proposes the following new combinations for species of which he has examined herbarium material and (with the exception of *P. alliaceum*) pollen-grains:

***Pseudocalymma Langlasseanum* (Kraenzl.) Sandwith, comb. nov.**
— *Petastoma Langlasseanum* Kraenzl. in Fedde Rep. Sp. Nov. xvii. 56 (1921). — Mexico.

***Pseudocalymma macrocarpum* (Donn. Sm.) Sandwith, comb. nov.**
— *Adenocalymma macrocarpum* Donn. Sm. in Bot. Gaz. xl. 9 (1905). — Mexico, Central America. Two of the authentic specimens of this species, viz. *Pringle* 3898, *von Tuerckheim* 7759, have nothing whatever to do with the genus *Cydista*, see in connexion with this Urban in Ber. Deutsch. Bot. Ges. xxxiv. 746-747.

***Pseudocalymma Sagotii* (Bur. et K. Schum.) Sandwith, comb. nov.**
— *Adenocalymma Sagotii* Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 110 (1896). — French Guiana.

***Pseudocalymma alliaceum* (Lam.) Sandwith, comb. nov.** — *Bignonia alliacea* Lam. Encycl. i. 421 (1785)!; DC. Prodr. ix. 148 (1845), partim. *Bignonia citrifolia* Vitm. Summa Pl. iii. 510 (1789). *Adenocalymma alliaceum* (Lam.) Miers in Ann. Nat. Hist. ser. 3, vii. 394 (1861); Bur. et K. Schum., l.c. 111. — Northern South America, possibly also in Trinidad and St. Vincent.

The following material, all smelling of garlic, is provisionally referred here after examination of Lamarck's type from French Guiana in Herb. Jussieu (Herb. Paris.):

BRITISH GUIANA. *Jenman* 6752 (Kew), *Parker* (Kew).

SURINAME. *Avanavero* Falls, *Kabalebo* R., *Pulle* 462 (Herb. Ultraject.).

FRENCH GUIANA. *Aublet* (Herb. Mus. Brit.). *La Caféière*, 1914, *Benoist* 509 (Herb. Paris.). Ann. 1872, *Etienne* (Herb. Paris.).

BRAZIL. State of Maranhão; *Maracassumé* River, *Froes* in *Krukoff* 1970 (Kew).

PERU. Dept. of Loreto; *Balsapuerto*, *Klug* 3096 (Kew).

Of these *Etienne*, *Klug* 3096 and *Jenman* 6752 approach closest to Lamarck's type in which the leaflets are strongly trinerved at a short distance above the base. Apart from his description and cited specimens, Lamarck refers to the garlic-smelling

Bignonia mentioned by Barrère and Aublet, both of which references confirm the species as a native of French Guiana; later authors confused the issue by identifying flowering West Indian or Peruvian material with *B. alliacea*, while Schumann's observation in the Flora Brasiliensis makes nonsense in the light of the historic evidence for the species. The exact interpretation of *P. alliaceum* will unfortunately remain doubtful until a flowering collection is received with leaflets exactly matching those of the type; but it is certainly a member of this genus. The inflorescence of *Jenman* 6752 and *Klug* 3096 is remarkable, being a long thyrses with compressed rachis and few, long, 3-flowered branchlets. The calyx is large, loosely campanulate and membranous, 1—1.5 cm long, up to 1.5 cm broad at the irregularly truncate frilly margin, venose and punctate-lepidote or verruculose. Corolla funnelshaped, lilac (*Klug*), about 5 cm long, thin and membranous, the limb rather sparsely ciliate and pubescent. Disk fleshy, annular. Ovary punctate-lepidote. Capsule (in *Jenman* 6752) elongate-linear, up to 40 cm long, 1.1—2.1 cm broad, valves very compressed and smooth, scattered-lepidote. Seeds not seen. Such an inflorescence differs remarkably from those of plants referred to this species by other authors such as Swartz, Miers, Grisebach and Schumann, and is outstanding in the genus, but an unmistakable passage towards it is shown by that of the Central American *P. macrocarpum*. The Suriname material referred to *Bignonia alliacea* Lam. by Splitgerber in Tijdschr. Nat. Geschied. en Phys. ix. 5 (1842) proves to be *Distictella racemosa* (Bur. et K. Schum.) Urb.

Pseudocalymma Pohlianum (Bur. et K. Schum.) Sandwith, comb. nov. — *Adenocalymma Pohlianum* Bur. et K. Schum. l.c. p. 114. — Brazil.

Pseudocalymma pachypus (K. Schum.) Sandwith, comb. nov. — *Anemopaegma pachypus* (sphalm. *platypus*) K. Schum. in Eng. Pflanzenfam. iv. 3 B, 215 (1894); in syn. in Mart. Fl. Bras. l.c. p. 110. *Adenocalymma pachypus* (K. Schum.) Bur. et K. Schum. l.c. p. 110. — Amazonian Peru.

Even after this has been done there remain numerous species which have recently been described in the genus *Adenocalymma* but of which the true generic affinity is doubtful from reading the description alone. And there is a very distinct group of species, of which *A. helicalyx* Kze. and *A. fissum* Loes. are members, occurring in Mexico, Central America, Venezuela and

Trinidad, which certainly cannot be placed on present evidence in either *Adenocalymma* or *Pseudocalymma*. This group has a peculiar calyx, pink corollas, trifid tendrils and tuberculate-echinate capsules, and may prove to represent a good new genus. Meanwhile, the following further combinations can be made for species of which material has been examined:

Adenocalymma impressum (Rusby) *Sandwith*, comb. nov. — *Bignonia impressa* Rusby in Mem. Torr. Bot. Club, vi. 100 (1896). *Adenocalymma sclerophyllum* Sprague in Verh. Bot. Ver. Brand. l. (50) 119 (1909). *Adenocalymma auristellae* Kraenzl. in Notizbl. Bot. Gart. Berlin, vi. 371 (1915). — Amazonian Brazil, Peru and Bolivia.

Stizophyllum punctifolium (Blake) *Sandwith*, comb. nov. — *Adenocalymma punctifolium* Blake in Contr. U.S. Nat. Herb. xxiv. 22 (1922). — Central America. Blake himself noted the similarity of his species to *Stizophyllum*, and the present writer feels no doubt of its position in that genus.

Stizophyllum flos-ardeae (Pittier) *Sandwith*, comb. nov. — *Adenocalymma flos-ardeae* Pittier in Contr. U.S. Nat. Herb. xviii. 256 (1917). — Panama.

Adenocalymma and Memora. The next difficulty with *Adenocalymma* is the question of how to distinguish it from *Memora* Miers which, as emended by Baillon and Schumann, is much more closely allied to *Adenocalymma* than to *Pleonotoma*, with which it really has no affinity. The two genera are quite obviously very similar indeed in most characters, including those of the pollen-grains, and if it be argued that *Memora* is not homogeneous, the reply is that it must be treated as such until the fruits of all the species have been collected. At present the only satisfactory characters by which *Memora* can be separated from *Adenocalymma* are the pinnate or bipinnate leaves (except the uppermost!) and the glabrous, outer surface of the corolla; and it must be confessed that the latter character breaks down in the instance of *Adenocalymma impressum*. If we agree to accept the combination of these two characters as essential for a species of *Memora*, then we have to reject from it the perplexing "bridge" species *M. bilabiata* Sprague, which has constantly bifoliate or trifoliate leaves and the corolla densely hairy outside, although the large bilabately split calyx is strongly reminiscent of *Memora*. At present only a single fruit has been seen with any collection of this species (unattached,

with *Rusby* and *Squires* 321, from the Orinoco Delta), and this — with its seeds — might conceivably be assigned to *Adenocalymma*. The pollen-grains of *M. bilabiata* are favourable, with reservations, to the inclusion of the species in *Adenocalymma*. They are not furrowed, and the exine is very finely and intricately reticulate, thus fitting Urban's description of the pollen-grains of *Adenocalymma*. On the other hand, the pollen-grains of such characteristic species as *A. comosum*, *A. racemosum* and *A. bracteatum* have been found to show an exine which is much less intricately reticulate with fewer and larger meshes. Moreover, although the grains of *M. bilabiata* are not furrowed the exine appears to be discoloured in three areas just where the three furrows of a trisulcate pollen-grain would be expected. It is possible that *M. bilabiata*, with its peculiar calyx, may eventually be proved to constitute a new genus but, on the whole, the balance of characters is at present in favour of the transference of this species from *Memora* to *Adenocalymma*, and the following new combination becomes necessary:

Adenocalymma bilabiatum (*Sprague*) *Sandwith*, comb. nov. — *Memora bilabiata* *Sprague* in *Bull. Herb. Boiss. sér. 2*, vi. 375 (1906). *Memora nobilis* *Miers* in *Proc. Royal Hort. Soc.* iii. 185 (1863), nomen. *Adenocalymma bilabiatum* *Sprague* ex *Pulle*, *Enum. Pl. Surinam*, 423 (1906), nomen.

Memora Schomburgkii (*DC.*) *Miers*. — *Spathodea Schomburgkii* *DC.* *Tanaecium ovatum* *Bur. et K. Schum.* *Memora consanguinea* *Bur. et K. Schum.* *Memora ovata* (*Bur. et K. Schum.*) *Sprague et Sandwith* in *Kew Bull.* 1932, p. 93.

All attempts to find specific differences between the material of *M. Schomburgkii* and that of *M. ovata* have failed although the two series present a widely different appearance to the casual observer. It is believed that the collections named *M. Schomburgkii* are simply those which show the well-developed lower leaves and branchlets of a species whose youngest shoots and uppermost leaves are represented by the collections of *M. ovata*. In fact, the specimens of *Robert Schomburgk* 365 at the British Museum indicate a transition from one series to the other. It cannot be repeated too often that the leaflets of species of *Bignoniaceae* present a remarkable range of variation in shape, size, texture and reticulation, which is often to be seen not merely in a series of collections but even on the carefully selected material of a single gathering from a single stem. Close allies of this species are the Amazonian *M. magnifica* (*Mart.*) *Bur.*, which

has pubescent leaflets and short corolla lobes; and *Adenocalymma heterophyllum* Kraenzl., based on Ule 7849 from the Rio Branco, which may prove to be a mere variant of *M. Schomburgkii*, but is at present transferred as follows:

Memora heterophylla (Kraenzl.) Sandwith, comb. nov. — *Adenocalymma heterophyllum* Kraenzl. in Notizbl. Bot. Gart. Berlin, vi. 372 (1915). — Brazilian Guiana (Ule's field-notes as to the flower-colour, "violett und weiss", are hardly credible).

Memora lenta (Mart. ex DC.) Bur. et K. Schum. in Mart. Fl. Bras. l.c. p. 265. — *Bignonia lenta* Mart. ex DC. Prodr. ix. 159.

This name was based by the authors of the Flora Brasiliensis on the union of *Bignonia lenta* Mart. ex DC. (*Temnocydia lenta* var. *a* Mart. mss.) with *Bignonia bracteolata* DC. (*Temnocydia lenta* β *angustifolia* Mart. mss.), the argument being that Martius' two forms, which were the types of de Candolle's species, were not separable even as varieties. No-one will dispute this who has examined the four sheets of Martius in the Munich Herbarium which have been written up as one or other of De Candolle's species and which were used by Bureau and Schumann for their original description of *Memora lenta*. Unfortunately, this is not the whole story. Bureau and Schumann themselves cited both *B. lenta* and *Temnocydia lenta* as synonyms of *Paragonia pyramidata*, again with notes of exclamation which indicate that they had seen Martius' material. Evidently, therefore, there was a mixture of two species in Martius' gatherings of *Temnocydia lenta*, one of them possessing the simply ternate leaves of *Paragonia pyramidata*, the other the biternate or triternate leaves which are seen in species of *Memora*. Examination of the evidence shows that Bureau and Schumann have apparently made a serious blunder in uniting *B. lenta* and *B. bracteolata* as representing the second of these two elements, which they have placed in *Memora*, and have added to the confusion by choosing the name *lenta* rather than *bracteolata* for the union. It is true that two of the sheets referred by them to *Memora lenta* have *B. lenta* written on the label, but on neither of them has this name been written by de Candolle himself. Moreover, the original description of *B. lenta* does not agree with these sheets nor with the description of *Memora lenta* — see the characters of the subbracteate panicle, the shape of the calyx, the indumentum of the corolla, the field-notes on the colour of the flowers, and the capsule — but it does quite obviously agree well with *Paragonia pyramidata*. The conclusion is that de Can-

dolle's type specimen of *B. lenta* is to be found in the material rightly referred to *Paragonia pyramidata*, that he was justified in creating two species, *B. lenta* and *B. bracteolata*, and that Bureau and Schumann had no valid reason for detecting two elements in his description of *B. lenta*. This is supported by the existence in the Prodrômus Herbarium at Geneva of fragments of the type of *B. lenta* which are certainly to be referred to *Paragonia pyramidata*. Returning to the four sheets of Martius which bear the material of *Memora lenta* Bur. et K. Schum., we find that one of them is certainly the type of *Bignonia bracteolata* DC., this name being written on the label in de Candolle's hand, and the material and other details, such as the absence of locality from the label, agreeing well with his description, if we except his failure to notice that the leaves were more than merely bifoliolate. It therefore becomes clear that the epithet *bracteolata* should have been retained for this species, whether it were united with *B. lenta* pro parte or not, when it was transferred to *Memora*.

It remains to consider the taxonomic position of *Memora lenta* Bur. et K. Schum. In spite of the character of the foliage and the facies of some of the leaflets, this species would occupy a wholly anomalous position in *Memora* on account of the conspicuous gland-fields at the nodes, the peculiarly small calyces of the floriferous thyrses, the densely pubescent outer surface of the corolla, and the presence in it of rose-violet colouring (white, dotted with rose-violet). All these characteristics, taken in conjunction with others (the fruit is unfortunately unknown), suggest that *M. lenta* should be removed to the genus *Arrabidaea*, in which are found two species with biternate leaves, viz. *A. inaequalis* (DC. ex Splitg.) K. Schum., and *A. biternata* Huber; the description of the latter, indeed, suggests close affinity with *M. lenta*. This being so, the following new combination becomes necessary: —

Arrabidaea bracteolata (D.C.) Sandwith, comb. nov. — *Bignonia bracteolata* DC. Prodr. ix. 157 (1845). *Memora lenta* (Mart. ex DC.) Bur. et K. Schum. in Mart. Fl. Bras. l.c. p. 265, quoad descr. tantum et syn. *Bignoniâ bracteolatâ*. — Amazonian Brazil.

Macfadyena uncata (Andr.) Sprague et Sandwith, comb. nov. — *Bignonia uncata* Andr. Bot. Rep. t. 530 (1808); Sims in Bot. Mag. t. 1511 (1813). *B. uncinata* G. F. W. Mey. Fl. Esseq. 210 (1818). *Spathodea uncata* (Andr.) Spreng. et *S. uncinata* (G. F.

W. Mey.) Spreng. Syst. Veg. ii. 835 (1825). *Macfadyena uncinata* (G. F. W. Mey.) Alph. DC. in DC. Prodr. ix. 180 (1845); Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 291 (1897). *Dolichandra Fenzliana* Miq. in Linnaea, xviii. 251 (1844). *Macfadyena Fenzliana* (Miq.) Miq. Stirp. Surinam. Sel. 125 (1850).

Distr. Widely spread over continental tropical America, and in Trinidad.

Mussatia Bur. ex Baill. Hist. Plantes, x. 32 (1891); K. Schum. in Engl. Pflanzenfam. iv. 3 B, 212, 223 (1894); Lemée, Dict. phan. iv. 599 (1932).

This genus, described at Paris and based on a species of which the type is at Geneva, has remained unknown to German students of the family, such as Schumann and Urban, who either did not visit those cities or borrow material from them. This is unfortunate, since they would have discovered that the single species of *Mussatia*, *M. Prieurei* (DC.) Bur. ex K. Schum., was represented at Berlin by material which Schumann had described as a new species of a different genus. For Leprieur's specimens of *Bignonia Prieurei* DC. (no. 273, type in Herb. DC., Geneva; duplicate in Herb. Paris.) are none other than *Anemopaegma brachycalyx* Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 145 (1896), based on *Schomburgk* 1569 from British Guiana. Schumann placed *A. brachycalyx* at the end of *Anemopaegma*, next to *A. cupulatum* Bur. et K. Schum., because of the outstanding peculiarities of these two species, and Urban later rejected it from *Anemopaegma* on account of the trisulcate pollen-grains (see Ber. Deutsch. Bot. Ges. xxxiv. 739 (1916)).

The salient characters of this striking genus may be summarised as follows: plant climbing by simple tendrils; branchlets glabrous but lepidote, strongly acutely tetragonous with thick ribs on the angles, without gland-fields at the nodes between the petioles; leaves bifoliate, leaflets often large; pseudostipules foliaceous, ovate, acute; inflorescence a showy, many-flowered, terminal thyrse, the flowers usually massed together, glabrate or lepidote; calyx very short, shallowly cupshaped-campanulate, irregularly lobed or split; corolla funnelshaped, conspicuously bilabiate, thin, densely glandular-lepidote outside, variegated, yellowish with brown, red or lilac stripes or markings, in the dried state marked within with purple lines; stamens inserted near the base of the tube, glandular-lepidote but without a zone of hairs at the point of insertion; anthers glabrous, with short arcuate-divergent or eventually subdivaricate thecae, and trisulcate ("tricolpate") pollen-grains; disk fleshy, broadly very shal-

lowly cupshaped with a wavy-crenulate fleshy margin; ovary broadly oblong, furrowed, lepidote; ovules 4-6-seriate in each loculus. The fruit and seeds have unfortunately not yet been collected.

Specimens of *Mussatia* have been associated with proposed new species of the genus *Tynnanthus* at different times by Schumann, Standley and Sprague. The strongly bilabiate corolla, which may be quite small, the short disk and the curved anther-thecae with trisulcate pollen-grains certainly favour this affinity; but actual identification with *Tynnanthus* seems inadvisable when we consider the tetragonous branchlets with conspicuous pseudostipules, the complete absence of pubescence except within the corolla-limb, the more cupshaped calyx, and the larger (very much longer in *M. Prieurei*) lepidote corolla of *Mussatia* with its dark stripes within the tube and peculiar colouring. It is significant that the same collection (*Funck and Schlim* 512) of *Mussatia* was referred at Paris by Bureau, who revised *Tynnanthus*, to a new species of the former genus, and by Schumann in the *Herbier Boissier* at Geneva to *Tynnanthus*. But apart from the characters mentioned, material of *Mussatia* has so distinctive a facies that it would be most unwise to reduce it to *Tynnanthus* or to any other genus, especially in the absence of evidence from fruit and seeds. On the whole, it would probably be wiser to suggest that *Mussatia* lies between *Tynnanthus* and *Arrabidaea* on the one hand, and *Cydista*, *Roentgenia* and *Potamogonos* on the other.

The material of *Mussatia* appears to be referable to two groups, that from Guiana and Amazonian Brazil having large corollas, while the specimens from Central America, Panama, Venezuela and Bolivia bear much smaller corollas with proportionately shorter stamens and anther-thecae. It would seem probable that the areas of the two groups meet in British Guiana. In the absence of fruit and seeds, it seems wise to retain the two as distinct species, although the writer is by no means certain that they will not prove to be mere variants of a single widely-distributed plant. The two species may be classified as follows:

- Well-developed corollas 3.5—5 cm. long; longer stamens more than 1.5 cm. long; anther thecae up to 2 mm. long
 1. *M. Prieurei* (DC.) *Bur. ex K. Schum.*
 Well-developed corollas scarcely up to 2 cm. long, often much shorter; longer stamens less than 1.5 cm. long; anther thecae scarcely reaching 1.5 mm. in length
 2. *M. hyacinthina* (Standley) *Sandwith.*

1. *Mussatia Prieurei* (DC.) Bur. ex K. Schum. in Engl. Pflanzenfam. iv. 3 B, 224 (1894). — *Bignonia Prieurei* DC. Prodr. ix. 154 (1845); Seemann, Bot. Herald, 179 (1854), quoad nomen; Hemsley, Biol. Centr.-Amer. Bot. ii. 491 (1881-2), quoad nomen; Baill. Hist. Plantes, x. 32 (1891), in obs. *Panterpa Prieurei* (DC.) Miers in Proc. Royal Hort. Soc. iii. 196 (1863), quoad nomen. *Anemopaegma brachycalyx* Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 145 (1896); Pulle, Enum. Pl. Surinam, 424 (1906); Urban in Ber. Deutsch. Bot. Ges. xxxiv. 739 (1916). *Bignonia brachycalyx* Klotzsch in Rich. Schomb., Reisen, iii. 1085 (1848), nomen tantum.

FRENCH GUIANA. Ann. 1833, *Leprieur* 273 (Conserv., Geneva; Herb. DC. (type) and Herb. Deless. Paris). *Martin* (Brit. Mus. Paris).

SURINAME. Kabalebo River, Dalgertop, *Pulle* 387 (Utrecht). Coppename River, fl. Aug., *Boon* 1074 (Utrecht). Coppename River, riverside below Raleighfalls, fl. Sept., *Lanjouw* 965 (Utrecht). Suriname River, near Warra-Warra, fl. July, *Tresling* 135 (Utrecht). Gran Rio, fl. Sept., *Hulk* 232 (Utrecht). Upper Gran Rio, *Stahel* 270 (Utrecht). Gonini River, in bank vegetation, fl. Sept., *Versteeg* 215 (Utrecht).

BRITISH GUIANA. Carimani and Corentyne Rivers, fl. Jan., *Rich. Schomburgk* 1569 (Berlin, fide Schumann). Caphiwiuin River, between sources of Corentyne and Essequibo Rivers, *Rob. Schomburgk* 49 "of last small set" (Kew). Mazaruni Station, fl. Oct., *Forest Dept.* 2335 (Kew).

BRAZIL. Amazonas; near mouth of Rio Embira, basin of Rio Jurua, fl. June, *Krukoff* 5080 (Kew). Probably to be referred here in spite of the small corollas present on this sheet.

2. *Mussatia hyacinthina* (Standley) *Sandwith*, comb. nov. — *Tynnanthus hyacinthinus* Standley in Carneg. Inst. Wash. Publ. no. 461, 87 (1935). *Bignonia Prieurei* DC. sec. Seemann, Bot. Herald, 179 (1854); sec. Hemsley, Biol. Centr.-Amer. Bot. ii. 491 (1881-2), non DC.

BRITISH HONDURAS. Jacinto Creek, fl. April, *Schipp* S. 661 (type coll., Kew. Brit. Mus. Conserv., Geneva). Camp 33, Guatemalan boundary survey, fl. April, *Schipp* 1241 (Kew. Brit. Mus. Conserv., Geneva).

PANAMA. Remedios, Veraguas, fl. March, *Seemann* 1128 (Kew. Paris).

VENEZUELA. Carabobo; selvas de Guaremales, cerca de Urama, camino de Puerto Cabello a San Felipe, fl. June, *Pittier* 8876 (Kew); Carabobo, fl. April, *Funck* and *Schlim* 512 (Conserv.,

Geneva. Herb. Boissier, Geneva. Paris). Eleanor Creek, Orinoco Delta, fl. May, *Rusby* and *Squires* 134, distributed as *B. Priurei* (Kew. Conserv., Geneva).

PERU. Without locality, *Pavon* ex Herb. Dunant (Paris).

BOLIVIA. Sara; Rio Surutú, Santa Cruz, fl. Oct., *Steinbach* 3517 (Kew. Conserv., Geneva).

The leaflets of this plant tend to be more ovate, and the inflorescences less dense, than those of *M. Priurei*.

Field-notes on the curious variegated colouring of the corolla of both species give the ground colour as from white to yellow, and the stripes or streaks as variously brown, brownish-pink, brick-red, lilac or purple. From this it seems clear that Standley was in error in suspecting that Schipp had incorrectly described the colour ("yellow streaked with brown") of the corolla of his second collection; rather it was the note ("purple") on the flower of the type collection which was inadequate or incorrect, and which unfortunately led Standley to give this species the somewhat misleading name *hyacinthinus*. The ovary of the type collection of *M. hyacinthina* is densely greyish-lepidote, and not glabrous as described by Standley; the ovules were 4-seriate in the single ovary which was dissected.

Pachyptera Kerere (Aubl. emend. Splitg.) Sandwith, comb. nov. — *Bignonia Kerere* Aubl. Hist. Pl. Guiane, 644, t. 260 (1775), excl. descr. fruct. et t. 263; Lam., Encycl. Bot. i. 420 (1783), descr. ex descr. Aublet. confecta; emend. Splitg. in Tijdschr. Nat. Geschied. en Phys. ix. 8 (1842); Miq. in Flora, xxv. 2, 427 (1842); DC. Prodr. ix. 154 (1845), partim; non *B. Cherere* Lindl. Bot. Reg. t. 1301 (1829). *B. heterophylla* Willd. Sp. Pl. iii. 298 (1801); Pers. Syn. ii. 171 (1807); Spreng. Syst. Veg. ii. 831 (1825). *Pachyptera foveolata* DC. Prodr. ix. 175 (1845); Bur. Monogr. Bignon., Atlas, p. 6, t. 4 (1864); Sprague et Sandwith in Kew Bull. 1932, p. 83. *Adenocalymma brachybotrys* DC., l.c. 202. *A. stridula* Miers in Ann. and Mag. Nat. Hist. ser. 3, vii. 392 (1861). *A. foveolatum* (DC.) Baill. Hist. Plantes, x. 7, ff. 9—16 (1891); K. Schum. in Engl. Pflanzenfam. iv. 3 B, 214 (1894); Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 109 (1896); Pulle, Enum. Pl. Surinam, 423 (1906); Urban in Ber. Deutsch. Bot. Ges. xxxiv. 738 (1916); Standley in Contr. U.S. Nat. Herb. xxvii. 340 (1928). *A. Kerere* (Aubl.) Bur. et K. Schum. in Mart. Fl. Bras., l.c. 119, partim; Pulle, l.c. 423. *A. symmetricum* Rusby in Descr. Three Hundred New Species S. Amer. Pl. p. 122 (1920). *Tanaecium Zetekii* Standley in Contrib. Arnold Arbor. v. 140, t. 19 (1933).

Distr. Central America, Panama, Colombia, Venezuela, Guiana and Amazonian Brazil.

Aublet's description of his species was faulty and deficient, the colour of the corolla being said to be yellow, and the fruit and seeds clearly belonging to a totally different plant, while salient characteristics, such as the gland-fields at the nodes and the top of the petiole, and the villous anthers, were wholly omitted. In spite of this, anyone who has more than a slight acquaintance with the very distinct plant known hitherto as *Pachyptera foveolata* or *Adenocalymma foveolatum* will not doubt that his tab. 260 is a convincing representation of that species. The shape and venation of the leaflets of Aublet's figure, the short, scarred, axillary raceme, the shape of the calyx and corolla, and, above all, the peculiar serial arrangement of the sharp-looking pseudostipules (mentioned in Aublet's description), unite to produce this feeling of certainty. Moreover, Aublet's own specimen at the British Museum, on which Miers based his *Adenocalymma stridula*, deliberately rejecting Aublet's epithet, is certainly *Pachyptera foveolata*. Finally, we have Splitgerber's emended description of *Bignonia Kerere*, published three years before *Pachyptera foveolata*, after an examination of Aublet's specimen. This gives an excellent account of *P. foveolata*, apart from the description of the tendril as simple — it is trifid in all specimens seen — and the omission of flower-colour; and Splitgerber's specimen 'at Leyden leaves the identification beyond doubt. Since, therefore, the identification of *Bignonia Kerere* Aubl. with the plant now known as *Pachyptera foveolata* was maintained by Splitgerber, Miquel and Miers, their views being based on Aublet's plate and at least part of his description and (in the case of Splitgerber and Miers) on his authentic specimen, and being supported by a good emended description, the present writer considers that Aublet's epithet should stand for this species in its correct genus *Pachyptera*.

Pithecoctenium obovatum Mart. ex DC. Prodr. ix. 196 (1845).

Not mentioned in the Flora Brasiliensis. There is a specimen in the Paris Herbarium from French Guiana, coll. *Martin*, which has been compared by Bureau with the type in Martius' Herbarium, and is probably part of the type collection. It is *Distictella elongata* (Vahl) Urb.

Potamogonos Sandwith, gen. nov.; ex affinitate *Cydista* Miers necnon *Roentgeniae* Urb., ab ambabus thyrso longo laxifloro, pedunculo atque rhachi valde applanata, calyce brevissimo

aperte cupulari, corollae tubo extra glabro nec dense lepidoto, disco minimo pedimentiformi, ovulis pro quoque loculo quadriseriatis differt. *Anemopaegma* Mart. forma inflorescentiae, calycis, ovarii, disci, colore florum, pollinis granula esulcata toto caelo differt; *Mussatia* Bur. (cum *Anemopaegmate brachycalyce* Bur. et K. Schum.) ramulis acute quadrangulis, cirrho simplici, corolla minore extra dense lepidota intus conspicue purpureo-vittata; *Pseudocalymma* Sampaio et Kuhlmann. facie atque venatione foliorum, odore saepius alliaceo, limbo corollae extra pubescente, ovulis pro loculo biseriatis differt.

Frutex ope cirrhorum scandens, glaber vel hic illic lepidotus, ramulis hornotinis subtetragonis annotinis subteretibus, cortice saepius purpurascens glabro, consociibus glandularum patelliformium supra nodos sitis. *Folia* bifoliolata, cirrho apice trifurcato terminata. *Inflorescentia* axillaris atque terminalis, longe laxe thyrsioidea pauciflora, pedunculo rhachique valde applanata. *Calyx* breviter aperte cupularis, truncatus sed inconspicue repando-lobatus. *Corolla* roseo-purpurea, magna, infundibularis, tubo extra glabro, limbo magno ciliolato extra alabastro dense lepidoto intus breviter villosopubescente. *Stamina* antica 1 cm. supra basim inserta, circiter 2 cm. longa, lateralia 0.7 cm. supra basim inserta, circiter 1.4 cm. longa; antherarum thecae glabrae, divaricatae; pollinis granula sphaeroidea, trisulcata, exine intricate reticulata. *Staminodium* 1 mm. supra basim insertum, 5 mm. longum. *Discus* brevissimus, pedimentiformis. *Ovarium* ovoideo-oblongum, sessile, basi haud contractum, dense lepidotum; stylus basi excepta lepidota glaber; ovula pro loculo quadriseriata, seriebus singulis circiter 8-ovulatis. *Capsula* et semina adhuc ignota. — Species unica, in sylvis primaevis densis, praesertim in ripis fluminum, Guianae crescens.

Potamoganos microcalyx (G. F. W. Mey.) Sandwith, comb. nov. — *Bignonia microcalyx* G. F. W. Mey. Fl. Esseq. 211 (1818); DC. Prodr. ix. 150 (1845), excl. var. β ; non *B. microcalyx* var. *acuminata* Miq. in Flora, xxv. 2, 427 (1842) et in Linnaea, xviii. 259 (1844), quae est *Pleonotoma chondrogona* (Miq.) Miers. *Anemopaegma microcalyx* (G. F. W. Mey.) Bur. et K. Schum. in Mart. Fl. Bras. viii, pars 2, 134 (1896), quoad nomen tantum, excl. descr. quae ad *A. Parkeri* Sprague refert; Pulle, Enum. Pl. Surinam, 423 (1906), partim excl. var. Miquel.; emend. ac ampl. Sprague et Sandwith in Kew Bull. 1932, p. 86, excl. descr. capsulae. *Anemopaegma cupulatum* Bur. et K. Schum. in Mart. Fl. Bras., l.c. p. 146; Pulle, l.c. p. 424; non *Bignonia cupulata* Splitz., quae est *Petastoma patelliferum* (Schlecht.) Miers.

Distr. British Guiana and Suriname.

For a full description of this species, drawn up from British Guiana material which included G. F. W. Meyer's type, see Kew Bull. 1932, pp. 86-88. Since this description appeared, certain points have been brought to light by the examination of further material. The type of *Bignonia cupulata* Splitg. has been borrowed from the Leyden Herbarium, and proves to be *Petastoma patelliferum* (Schlecht.) Miers. Moreover, examination of the Brussels specimen of Wulfschlaegel 1032, which has been written up by Schumann as *Anemopaegma microcalyx* and which is no doubt the type of his description of that species, shows that it is the very different *Anemopaegma Parkeri* Sprague. This specimen agrees with the description of *A. microcalyx* in the Flora Brasiliensis, a fact which accounts for the discrepancies noted by Sprague and Sandwith between this description and their own emended description of the true *A. microcalyx* (G. F. W. Mey.) The material of Wulfschlaegel 1032 at Berlin, which is certainly *A. microcalyx* (G. F. W. Mey.) and not *A. Parkeri*, must have been selected as a duplicate either from a mixed gathering or, by a scribe's error, from Wulfschlaegel 1034 (*A. microcalyx*, written up by Bureau as *Anemopaegma? cupulatum* Bur.) at Brussels. Thus the description of *A. microcalyx* in the Flora Brasiliensis must be referred to *A. Parkeri*, while that of *A. cupulatum* belongs to *A. microcalyx* (G. F. W. Mey.) It must unfortunately be added that the description of the capsule of this species must now be excluded from Sprague and Sandwith's emended description owing to an error in identification; the Paris specimen (coll. Soubirou) from which it was taken has been re-examined and proves to be *Martinella obovata* (H. B. K.) Bur. et K. Schum. The fruit of *Potamogonos microcalyx*, which appears to be a local species of Guiana, is still unknown.

In spite of this, the creation of a new genus for this plant has proved inevitable for the purposes of the present work. Its retention in *Anemopaegma* is quite impossible, nor can it be referred with confidence to any of the allies suggested in the above diagnosis, owing to a combination of peculiar characteristics which is not exhibited by any species yet included in them. It is possible that the genus *Pseudocalymma*, which needs further study, will prove to be the closest affinity. For the present, however, a new genus, which should be regarded as provisional, is proposed for this plant which, apart from other characters, has a remarkably individual facies due chiefly to the wine-coloured younger branchlets, petioles, petiolules and inflorescence, the venation and

surface of the leaflets, and the unusually showy corollas.

Tabebuia aquatilis (E. Mey.) Sprague et Sandwith in Kew Bull. 1932, p. 21.

When the above combination was made reasons were given for the rejection of *Bignonia fluviatilis* Aubl. as a *nomen dubium*. A re-reading of all the literature connected with the *Tabebuias* of Suriname, and an examination of more herbarium material, shows that any attempt to apply Aublet's name could only result in further difficulty and confusion. There are in Suriname two riverside and swamp-forest *Tabebuias* with white flowers and lepidote calyx which may be distinguished as follows:

- A. Leaflets rather narrowly elliptic or oblong, sometimes almost lanceolate, up to 7 cm. broad, conspicuously long-acuminate at the apex, usually acutely cuneate at the base but sometimes obtuse or rounded, main lateral nerves usually 10—12 on each of the midrib. Corolla glabrous within except below the insertion of the stamens. Capsule oblong-linear, 2—3.5 cm. broad. Seeds almost suborbicular, wholly coriaceous.

This species was identified with some doubt with *Bignonia fluviatilis* Aubl. by G. F. W. Meyer. Then E. Meyer, who rejected Aublet's name as dubious, described it as *B. aquatilis* (from a specimen with leaflets rounded at the base (Hostmann, Herb. Göttingen!)) and *B. digitata*, the two being distinguished mainly on characters of the lobing of the calyx which were later shown by Miquel to be worthless. Next Splitgerber described it as a new genus *Couralia* and revived Aublet's epithet, his name *Couralia fluviatilis* being later adopted by Bureau and K. Schumann in the *Flora Brasiliensis* where *Couralia* was distinguished from its allies on the ground of the corky seeds. Then de Candolle, in the *Prodromus*, reduced E. Meyer's *B. aquatilis* ("calyx bilabiate") to his own new combination *Tabebuia fluviatilis* (Aubl.) DC., and gave the new name *Tecoma Meyeriana* to E. Meyer's *B. digitata* ("calyx 5-dentate") owing to the pre-existence of *Tecoma digitata* H. B. K. Finally Miquel, in his *Stirpae Surinamenses Selectae*, rightly pointed out the error of separating new species of this affinity on the evidence of the lobing or splitting of the calyx at different stages of its age. Placing the species in *Tecoma*, Miquel still distinguished *T. fluviatilis* (Aubl.) Miq. and *T. Meyeriana* DC. (*Bignonia digitata* E. Mey.), separating them this time mainly on the shape of the leaflets and the direction of the lateral nerves. He gave an entirely original description of *T. Meyeriana*, based on a Focke

specimen (no. 1245, Utrecht!). This has been examined, and it has been discovered that, while the flowers and branchlets undoubtedly belong to this *Tabebuia*, the leaflets and petiole — which are detached — are those of *Pachira aquatica* Aubl. No wonder, then, that Miquel distinguished this collection as a distinct species on the evidence of characters in the leaflets! In the same paper Miquel described a third, new, species of *Tecoma*, *T. insignis*, with fewer lateral nerves on the leaflets and corolla hairy within. He based his description on *Kappler* no. 1697 but — most unfortunately — placed Splitgerber's *Couralia fluviatilis* in synonymy and further suggested that E. Meyer's *Bignonia aquatilis* was conspecific and that Meyer had failed to notice the pubescence of the corolla. But Splitgerber's *fluviatilis* and Meyer's *aquatilis* belong to the species now under discussion, which should be called *Tabebuia aquatilis*, and not to Miquel's *T. insignis* which was wrongly referred by Sprague and Sandwith in 1932 to *T. aquatilis* and is, in fact, the species to be considered next.

B. Leaflets elliptic or oblong, up to 11.5 cm. broad, acute or shortly cuspidate at the apex, rarely long-acuminate, cuneate to rounded at the base, usually stiffly coriaceous, main lateral nerves usually 7—9 on each side of the midrib. Corolla with ciliolate limb and more or less pubescent on the inner side of the lobes, conspicuously adpressed pilose at the throat along the bases of the anterior lobes and down the anterior side of the tube. Capsule linear, 0.8—1.5 cm. broad. Seeds transversely oblong, with broad membranous hyaline wings.

This plant was first described by Miquel as *Tecoma insignis*; the type specimen (*Kappler* no. 1697, Utrecht!) has thinner and more long-acuminate leaflets than are usually collected, but the venation and pubescence of the corolla are unmistakable. Later, Bureau and K. Schumann in the *Flora Brasiliensis* described it as a variety *salpingophora* of *Tecoma Leucoxylon* (L.) Mart. ex DC., but *T. Leucoxylon* is a very distinct species of the West Indies. More recently, material of the same species from Amazonian Brazil has been described as *Tecoma albiflora* by Ducke. In spite of Miquel's misidentification of his *insignis* with Splitgerber's *Couralia fluviatilis*, and his reference to Splitgerber's description of the trunk and fruit, we must accept his good general description which is based on *Kappler* 1697, and the following new combination becomes necessary:

Tabebuia insignis (Miq.) Sandwith, comb. nov. — *Tecoma*

insignis Miq., Stirp. Surinam. Sel. 122-123 (1850), pro majore parte, excl. syn. Splitg. atque descr. trunci fructusque. *Tecoma Leucoxylon* (L.) Mart. ex DC. var. *salpingophora* K. Schum. in Bur. et K. Schum. in Mart. Fl. Bras. viii pars. 2, 342 (1897); Pulle, Enum. Pl. Surinam, 428 (1906). *Tecoma albiflora* Ducke in Arch. Jard. Bot. Rio de Janeiro, iv, 175 (1925).

Distribution: Suriname, French Guiana (*Sagot* 415, *Wachenheim* 56, etc.), Amazonian Brazil (*Ducke* 18173, 22670, 22671), Amazonian Venezuela (*Spruce* 3374).

In attempting to interpret Aublet's description and figure of *Bignonia fluviatilis* botanists have been troubled and confused by no less than four characters, viz. the shape of the base of the leaflets, the lobing of the calyx, the shape of the capsule, and the wing of the seeds. The rounded base of the leaflets in Aublet's figure is rare but may occur in *T. aquatilis*, and the numerous lateral nerves and long acumen are certainly those of that species. The breadth of the capsule, but not its apex, favours *T. aquatilis*; but the seeds with their thin membranous wings cannot possibly be referred to it. The only specimen of Aublet's which has been found in Herb. Mus. Brit. consists of leaves only and has the leaflets attenuate at the base. No mention is made by Aublet of the presence or absence of indumentum within the throat of the corolla. Since all the elements of Aublet's plant when taken together cannot be referred to any known species, and the several elements have been such a source of confusion to later interpreters, the wisest course is to treat his name as *nomen dubium*.

Tabebuia longipes Baker. This tree, which was described by Baker as a new species, is frequent in British Guiana, and much material has recently been seen from Suriname. Comparison of *T. longipes* with *T. insignis* shows such remarkable agreement in all essential characters that one is led to believe that *T. longipes* is not more than a very interesting variety which has been evolved from *T. insignis*, from which it differs only in its constantly one-foliolate leaf. In Suriname *T. longipes* and *T. insignis* grow together in the same locality at the Forest Reserve of Zanderij I, but *T. longipes* has extended westwards into British Guiana where *T. insignis* has not yet been collected. The leaves of *T. insignis* are 3—5-foliolate, but on one collection two small 1-foliolate leaves were noted at the apex of a branchlet. The variety may be described as follows:

Tabebuia insignis (Miq.) Sandwith var. *monophylla* Sandwith, var. nov.; a typo foliis semper 1-foliolatis, lamina cum petiolo

basi petioluli usque 8 mm. longi (saepe multo brevioris) articulato differt. — *T. longipes* Baker in Hook., Ic. Pl. (1888) t. 1738; Sprague et Sandwith in Kew Bull. 1932, p. 21.

Distribution: Suriname, British Guiana.

Tabebuia capitata (Bur. et K. Schum.) Sandwith, comb. nov. — *Tecoma capitata* Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 337 (1897). *Tabebuia hypolepra* Sprague et Sandwith in Kew Bull. 1932, p. 25.

Examination of the type of *Tecoma capitata* (Teffe, Brazil, coll. Poeppig 138 in Herb. Berol.) leaves no doubt that it is conspecific with *Tabebuia hypolepra* of Guiana, which accordingly becomes a synonym. Herbarium material of this species is with difficulty distinguished from that of *T. serratifolia* (Vahl) Nichols., although the two species appear to grow on a different type of soil and possess distinct vernacular names (Groenhart, *T. serratifolia*; Makkagroenhart, *T. capitata*). Characters taken from the leaflets are unsatisfactory for use in a key, since the raising or impression of veinlets varies considerably, as does the quantity or visibility of scale-dotting. Since these trees usually shed their leaves before flowering, it was desirable to find some characters in the inflorescence by which the two species might be distinguished. Investigation of the flowers shows that *T. capitata* is densely villous-pilose with stiff, mostly somewhat flattened hairs, along the anterior inner side of the corolla tube; whereas that of *T. serratifolia* is much less densely pilose with longer, very weak hairs. Again, the ovary of *T. capitata* does not seem to show the conspicuous plate-shaped glands which are visible on the fatter, more ovoid-oblong, and warty ovary of *T. serratifolia*. The flowering material collected by Focke (Kew!) which was distributed by Miquel, and which probably represents the plant mentioned by him as *Bignonia Leucoxylon* L. in Flora, xxv, 2, p. 427 and later made into the var. *Miquelii* DC. of that species, is to be referred to *T. capitata*; whereas Miquel's later elaborate description of Suriname *B. Leucoxylon* in Linnaea xviii, p. 257 is clearly nearer *T. serratifolia*. *T. capitata* usually has a more conspicuously and more coarsely stellate-pubescent calyx than *T. serratifolia*, and a similar indumentum is also much stronger and more persistent on its petioles and petiolules. It has been collected recently in all three Guianas, and also in Amazonian Brazil (Krukoff 1965!, 1975!, 5049!) where it is known as "Pau d'arco preto".

Closely allied to *T. capitata* is *Tabebuia obscura* (Bur. et K. Schum.) Sandwith, comb. nov. (*Tecoma obscura* Bur. et

K. Schum. in Mart. Fl. Bras., viii. pars 2, 343 (1897). This was based on *Spruce* 1979 from the Rio Negro (Kew!), and has recently been collected by W. Fox at La Chorrera, Dept. Loreto, Amazonian Peru (no. 41, Kew!), and by Tessmann at Iquitos (no. 5144, Herb. Conservat., Geneva!). This again may be distinguished from *T. capitata* by the indumentum of the anterior inner side of the corolla tube, which consists of very much shorter, almost scurfy, stiff hairs. This species is also distinctly stellate-pubescent on both surfaces of the leaflets when young, and its calyx is conspicuously rusty.

Tecoma conspicua DC. Prodr. ix. 221 (1845); Bur. et K. Schum., l.c. 343, in obs.

Type in Herbier de la Guyane, Herb. Paris!; duplicate in Herb. Jussieu, Herb. Paris! Unknown to Schumann. The specimens bear flowers and extremely young, undeveloped leaves; they are clearly referable to *Tabebuia serratifolia* (Vahl) Nichols.

Tecoma Patrisiana DC. Prodr. ix. 221 (1845); Bur. et K. Schum., l.c. 342, in syn.

Type in Herb. DC., Herb. Conservat., Geneva! Unknown to Schumann, who placed the species, with doubt, under *Tecoma Leucoxydon* (L.) Mart. ex DC. The specimen proves to be referable to *Tabebuia serratifolia* (Vahl) Nichols.

II. Notes on the identification of Vahl's new species of *Bignonia*.

Nine new species of *Bignonia*, collected in the West Indies and Northern South America by Dr. West, Ryan and von Rohr, were described by Vahl as follows: in Symb. Bot. iii. 80—81 (1794), *B. lactiflora* and *B. spectabilis*; in Eclog. Amer. ii. 43—48 (1798), *B. tenuisiliqua*, *B. villosa*, *B. laurifolia*, *B. elongata*, *B. corymbifera*, *B. mollis* and *B. serratifolia*. Of these, *B. mollis* was not strictly new, or even legitimate, since Vahl cited as a synonym *B. tomentosa* L. C. Rich.; since, however, Richard's name was antedated by *B. tomentosa* Thunb., Vahl's epithet which was taken up by Schumann may be retained for the species. The identity of six of these species has been satisfactorily determined in the past, and there seems no need to call in question the following identifications:

B. lactiflora Vahl is *Distictis lactiflora* (Vahl) DC.

B. spectabilis Vahl is *Cydistis aequinoctialis* (L.) Miers

B. laurifolia Vahl is *Paragonia pyramidata* (Rich.) Bur.

B. elongata Vahl is *Distictella elongata* (Vahl) Urb.

B. mollis Vahl is *Arrabidaea mollis* (Vahl) Bur. et K. Schum.
B. serratifolia Vahl is *Tabebuia serratifolia* (Vahl) Nichols.
 (T. araliacea (Cham.) Morong et Britton).

Of the remaining three, *B. tenuisiliqua* and *B. villosa* have apparently never been identified by later botanists, while the identification of *B. corymbifera* by all writers except Willdenow with an *Arrabidaea* which is unknown in the West Indies and has very rarely been found in the coastal region of Northern South America, where von Rohr collected *B. corymbifera*, gave grounds for suspicion. The types of these three species have been kindly lent by the authorities of the Botanical Museum at Copenhagen, and their identification may now be discussed as follows:

1. *Bignonia tenuisiliqua* Vahl, Ecl. Am. ii. 43 (1798); Spreng. Syst. Veg. ii. 829 (1825); DC. Prodr. ix. 144 (1845).

"Habitat in America meridionali, von Rohr".

Unknown to de Candolle, and to Bureau and Schumann.

The type specimen removes all doubt as to the identity of the species. It is *Catalpa longissima* (Jacq.) Sims, Jacquin's *Bignonia longissima* fortunately antedating Vahl's name by many years. The distribution of this species makes it clear that von Rohr collected his plant in the West Indies, and possibly either in Jamaica or in Martinique, which were visited by him during his investigations into the cultivation of cotton.

2. *Bignonia villosa* Vahl, Ecl. Am. ii. 44 (1798); Spreng. Syst. Veg. ii. 830 (1825), quoad nomen tantum; DC. Prodr. ix. 161 (1845); K. Schum. apud Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 49 (1896), in obs.

This plant was unknown both to de Candolle and to K. Schumann. The former placed it in a group of *species non satis notae*, remarking that it appeared to be totally different from the plant which was referred to this name by Sprengel, and which he had made the type of his own *B. Balbisiana* DC. Prodr. ix. 153. This plant, specimens of which were in de Candolle's possession, was collected by Bertero in the province of Santa Marta, Colombia, and according to Sprengel near the Magdalena River. It was unfortunate that de Candolle cited in synonymy under *B. Balbisiana* the name *Bignonia villosa* Bert. mss. with the reference from Sprengel's Systema, since both the Index Kewensis and Bureau and Schumann afterwards assigned the publication of this name to Sprengel, where-

as the latter attributed the authorship of *B. villosa* to Vahl, and was identifying Bertero's material with Vahl's species. It is obvious from Sprengel's description of the Bertero plant that his identification was wholly incorrect, as noted by de Candolle. Schumann, however, who also saw Bertero's material, observing the coincidence of the type locality (Santa Marta) of *B. Balbisiana* (*B. villosa* Bert. mss.; *B. villosa* Vahl sec. Spreng.) with that of *B. villosa* Vahl, still thought that the two might represent one and the same plant, a conclusion reached perhaps by a misinterpretation of de Candolle's remarks under his description of *B. villosa* Vahl. The reduction by Bureau and Schumann of *B. Balbisiana* DC. to *B. rotundata* (DC.) Bur. ex K. Schum. is another matter which will be discussed elsewhere.

The type material on the sheet of *B. villosa* Vahl, which was collected at Santa Marta by von Rohr, contains two elements, neither of which shows the remotest connexion with *B. Balbisiana* and its allies. There is a single well-preserved flower, with pedicel, calyx and corolla, which is detached from the rest of the material, and this obviously belongs to *Cydista aequinoctialis* (L.) Miers. The remainder consists of a branchlet with several leaves and tendrils in good condition, and it clearly bears no relationship to *Cydista aequinoctialis*. The conspicuous gland-fields at the nodes, and the simple tendrils, suggest the genus *Arrabidaea*, and a fairly good match is found with two other collections from Santa Marta which have been referred to *Arrabidaea*, viz. Goudot, distributed as *Bignonia mollis*, and H. H. Smith 743, distributed as *Arrabidaea Sanctae-Marthae* Sprague sp. nov. ined. It is probable that all these collections are closely allied to, perhaps conspecific with, *A. mollissima* (H.B.K.) Bur. et K. Schum.; they do not in the least resemble *A. rotundata* and its allies. Meanwhile, since Vahl's material and description of his *Bignonia villosa* are composed of two discordant elements, the only course is to treat his name as a *nomen ambiguum*.

3. *Lundia corymbifera* (Vahl) Sandwith, comb. nov. — *Bignonia corymbifera* Vahl, Ecl. Am. ii. 45, t. 17 (1798); Willd. Sp. Pl. iii. 296 (1801); Cham. in Linnaea, vii. 712 (1832), quoad nomen; DC Prodr. ix. 150 (1845), quoad nomen. *B. umbrosa* H.B.K. Nov. Gen. et Sp. Pl. iii. 138 (1819); DC. l.c. 164. *Lundia umbrosa* (H.B.K.) Bur. in Adansonia, viii. 282, t. 6 (1867-8); K. Schum. in Engl. Pflanzenfam. iv. 3 B, 224 (1894); Bur. et K. Schum. in Mart. Fl. Bras.

viii. pars 2, 239 (1897). *Arrabidaea corymbifera* (Vahl) Bur. ex Schum., ll. cc. 213, 37 (1896), quoad nomen tantum.

Examination of Vahl's type of *Bignonia corymbifera* leaves no doubt whatever that his species is the widespread plant hitherto known as *Lundia umbrosa*, and not the well-known Brazilian and Paraguayan species of *Arrabidaea* with which it has for so long been associated. This is a most unfortunate error of identification, committed first by Chamisso and de Candolle, who probably were relying solely on Vahl's description and plate, and later with much less excuse both by Bureau and Schumann. It is curious that both of the latter authors admitted that Willdenow's *Bignonia corymbifera* was conspecific with *Lundia umbrosa* but insisted that he had misidentified the plant of Vahl. It is even more strange that Schumann actually saw Vahl's type specimen and wrote on the sheet his identification "*Arrab. B. corymbifera*". On the back of the sheet we learn that the specimen was collected by von Rohr (no. 6) in Trinidad. The locality, which extends the information ("*habitat in America meridionali*") given by Vahl in his description, is of significance, since *Lundia umbrosa* is well known in Trinidad, whereas *Arrabidaea corymbifera* (Vahl) Bur. ex K. Schum. quoad descr. et syn. has not been recorded from the island.

What then is the correct name for the species which is familiarly known as *Arrabidaea corymbifera*? There are two rival claimants, viz. *Bignonia dichotoma* Vell. Fl. Flum. descr. 248 (1825), Ic. vi, t. 32 (1827) and *B. Selloi* Spreng. Syst. Veg. ii. 831 (1825). Vellozo's plate, and the existence of Sellow's type in the Berlin Herbarium where it was seen by Schumann, determine adequately the identity of both species. Since both were published in the same year, and the writer has not discovered which appeared first, he has decided to give preference to Vellozo's name for which the necessary combination already exists in *Arrabidaea*. This species should therefore be known in future as *Arrabidaea dichotoma* (Vell.) Bur. in Kjoeb. Vidensk. Meddel. ann. 1894, p. 99.

III. The Identity of Thunberg's Brazilian Bignoniae.

Between the years 1817 and 1821 Thunberg published three series of "*Decades Plantarum Brasiliensium*", comprising descriptions of new species, with figures of five of them. The plants were collected by the German traveller G. W. Freyreiss who at this period was patronised and supported by the Swedish

Consul-General to Brazil, L. Westin. A large number of the species are unlocalised, but many are stated to have been found on mountains or in damp places near Villa Rica. Between 1815 and 1817 Freyreiss was the companion of Sellow and Prince Maximilian Wied-Neuwied, and he is known to have travelled in the States of Rio de Janeiro, Espirito Santo, Minas Geraes and Bahia. The specimens examined by Thunberg are now preserved in the Herbarium of the Uppsala Botanical Institution. In the third decad, published in 1821, are found descriptions (nos. 26-28) of three species of *Bignonia*, *B. elliptica*, *B. binata* and *B. jasminoides*, all of them unlocalised. These have never been related with certainty by any author to any known species of the family, and it is evident that neither de Candolle nor K. Schumann had seen the type specimens when they prepared their extensive accounts of the tropical American *Bignoniaceae* for the Prodrômus and the Flora Brasiliensis. The specimens have recently been lent to Kew by the kindness of the authorities of the Uppsala Botanical Institution. They are in good condition and can all be identified with described species; one of them is a member of the *Acanthaceae*, while the two others can be assigned to well-known species of *Bignoniaceae* which bear names later than those of Thunberg and will therefore require new combinations in their respective genera. The results of the examination are as follows: —

1. *Bignonia elliptica* Thunb. Pl. Bras., decas tertia, no. 26, p. 34 (1821) is *Ruellia macrantha* (Nees) Mart. ex Lindau. (*Dipteracanthus macranthus* Nees). Thunberg's trivial antedates that of Nees, but it is preoccupied in *Ruellia* by *R. elliptica* Rusby (1900).
2. *Clytostoma binatum* (Thunb.) Sandwith, comb. nov.—*Bignonia binata* Thunb. Pl. Bras., decas tertia, no. 27, p. 35 (1821)!; DC. Prodr. ix. 189 (1845); Bur. et K. Schum. in Mart. Fl. Bras. viii. pars. 2, 128 (1896) in syn. sub *Anemopaegmate Chamberlaynii* (Sims) Bur. et K. Schum. *B. calistegioides* Cham., forma β , in Linnaea, vii. 714 (1832). *B. noterophila* DC. Prodr. ix. 148 (1845). *B. umbellulata* DC., l.c. p. 148. *B. purpurea* Lodd. ex Hook. fil., Bot. Mag. t. 5800 (1869). *Clytostoma noterophilum* (DC.) Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 153 (1896). *C. purpureum* (Lodd. ex Hook. fil.) Rehder apud Bailey, Standard Cycl. Hort. ii. 806 (1914). — Tropical South America; Venezuela, Guiana, Brazil and Paraguay.

Thunberg's species bears no resemblance to *Anemopaegma Chamberlaynii* (Sims) Bur. et. K. Schum. (*A. racemosum* Mart. ex DC.) to which it was referred with doubt by de Candolle, and without doubt by the Index Kewensis. The type specimen is immediately identifiable with the well-known and widely distributed species hitherto known as *Clytostoma noterophilum* (DC.) Bur. et K. Schum. The specimen is hardly typical of ordinary forms of the species owing to the peculiarly long "peduncle" of the inflorescence which is terminated by short and very narrow bracts such as are often found in *C. noterophilum*; this "peduncle" is commonly better described as a short axillary shoot with cataphylls near the base and terminated by a pair of reduced foliage leaves or foliaceous bracts from which arises the fascicle of long pedicels. Again, in Thunberg's specimen the calyx-teeth, which are often very minute in *C. noterophilum*, appear to be obsolete.

3. *Jacaranda jasminoides* (Thunb.) *Sandwith*, comb. nov.—*Bignonia jasminoides* Thunb. Pl. Bras., decas tertia, no. 28, p. 36 (1821) !; DC. Prodr. ix. 167 (1845); Bur. et K. Schum. in Mart. Fl. Bras. viii. pars 2, 288 (1897). *Jacaranda tomentosa* R. Br. in adnot. sub Bot. Mag. t. 2327 (1822); DC., l.c. 231; Bur. et K. Schum., l.c. 370, cum syn.—Brazil.

Thunberg's specimen agrees excellently with material of the very distinct *J. tomentosa*. His mention of the calyx as "vix lineam longus" can only refer to the lobes, and his description is faulty in other respects as, for instance, the strength of the indumentum of the lower surface of the leaflets, and the length of the corolla.