

STUDIES IN THE APOCYNACEAE. VII¹

AN EVALUATION OF THE GENERA *PLUMERIA* L. AND *HIMATANTHUS* WILLD.

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Even a casual examination of a suite of herbarium specimens of the inclusive genus *Plumeria* will demonstrate that the representations indigenous to America roughly north and south of Panama are of very distinctive appearance. It is true that both groups are constituted of rather small to moderate-sized trees with disproportionally thick, fistulose branches and a spongy, suberized periderm; usually rather large, fleshy, spiral foliage which is very deciduous; and broad inflorescences of handsome, waxy flowers. However, the representation roughly from Panama northward, including two species in northern South America, but particularly abundant in Central America, southern Mexico, tip of peninsular Florida, and the Antilles proper, including the Bahama Islands, and that of South America, from Panama to southern Brazil, are distinguishable at a glance because of the large, petalaceous bracts of the latter.

It has long been known as well that the northern species are characterized by a regular calyx of five equal to subequal lobes, whilst the calyx of the southern species either is not manifest, or is composed of two to five minute appendages of very unequal size and shape. The stems of the northern species also are more swollen, but with lighter wood than those of the southern, which make plants of the two groups easily distinguishable in the field, even when without either flowers or foliage, a condition which frequently occurs. Because of its extreme light-

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ness, the wood of the northern species is not valuable commercially, whilst that of the southern species constitutes the timber known as "Sucuúba" in the Amazon valley and contiguous Guiana.

Three species of *Plumeria* were known to Linnaeus, who retained the name from Tournefort: *P. rubra* (Sp. Pl. ed. 1. 1: 209. 1753), *P. alba* (ibid. 210), and *P. obtusa* (ibid.). All three are of the northern group, and are inhabitants of Central America and the Antilles. It is strange, therefore, with the typical element of the genus so well indicated, that so careful a student as Mueller-Argoviensis (in Mart. Fl. Bras. 6¹: 42. 1860) should have considered the large-bracted species typical, and should have suggested that the small-bracted species might constitute a genus separate from *Plumeria*! This confusion was repeated more recently by K. Schumann (in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895), who grouped both the small-bracted northern species and the large-bracted southern species under the division "Bracteen gross, leicht abfallend. . ." in his key to the species contained in the 'Naturlichen Pflanzenfamilien.'

In the meanwhile the name *Himatanthus* Willd. had been proposed in Roemer & Schultes's 'Systema' in 1819, based upon a large-bracted species from northeastern Brazil, with satisfactory descriptions both generic and specific. *Himatanthus* was not known to Mueller, evidently, and was ignored by Schumann and subsequent writers as a pure synonym for *Plumeria*.

From a somewhat extended study of the North and South American representations, however, it becomes apparent that *Plumeria* and *Himatanthus* should not be considered as congeneric, since they may be distinguished by several important morphological factors as follows:

Inflorescence fastigiately thyrsiform, the secondary branches irregularly congested; bracts inconspicuous, scarious, caducous, not subtended by pectinate adaxial glands at the base; calyx-lobes always manifest, essentially equal, the tips obtuse to very shortly acuminate, always glandular; ventral loculi of the anthers conspicuously protuberant at the base; seeds provided with an eccentric, basal wing.....PLUMERIA

Inflorescence rather regularly thyrsiform, the secondary branches alternate and relatively distant; bracts large and showy, petalaceous or foliaceous, caducous, subtended by numerous minute, pectinate, adaxial glands at the base; calyx-lobes very irregular in size, gradually acuminate and not glandular at the tip, or the calyx not manifest; ventral loculi of the anthers not protuberant; seeds provided with a broad, more or less concentric, papery wing HIMATANTHUS

Of the characters mentioned above, perhaps the only one which requires special discussion is the glandular character of the calyx of *Plumeria*, the calyx-lobes being found with the naked eye to be somewhat discolored and "sticky" at the tip. When examined in section by means of the compound microscope, the epidermal cells of the calyx tip are found to be elongated horizontally, and to have other histological and cytological characteristics of secretory tissues, such as those of the calycine "squamellae" of numerous other Apocynaceae, which are lacking in both *Plumeria* and *Himatanthus*.

At this juncture it may not be amiss to accentuate again that the distributions of *Plumeria* and *Himatanthus* are not strictly separated by arbitrary boundaries, as both occur somewhat sparingly in eastern Panama, and in Colombia, Venezuela, and the Guianas. However, the distribution of the former reaches its climax in Central America and the Greater Antilles, whilst the latter is particularly characteristic of the Amazon valley. Plants of undoubted northern affinities have been found elsewhere in South America and have been proposed as distinct species by Ruiz & Pavon, Mueller-Argoviensis, and others. But the same is true for as widely separated localities as Madagascar, the Philippine Islands, and southeastern Asia, where from a superficial observation *Plumerias* may appear to be spontaneous, and from whence novelties were described occasionally before it was recognized that the plants undoubtedly had escaped from early cultivation by the colonial Spanish, English, and French. At this time it may not be too late to indicate Central America as the probable provenience of these widely cultivated ornamental trees. The South American species (*Himatanthus*) have been cultivated much less than those of the North (*Plumeria*), possibly since, although the inflores-

cence is as copious and the flowers as large, there is a marked tendency for fewer flowers to be open at one time because of the greater structural regularity of the inflorescence.

Although our knowledge of the botany of tropical America still is deplorably scant, it appears possible upon our present herbarium representation to offer a tentative revision of the species of both *Plumeria* and *Himatanthus* incidental to a reformation of the genera. Even though limited in scope, such an evaluation should be of considerable aid to those who find the attenuated specific distinctions of Mueller, Britton, Urban, and others of little practical value in the classification of their specimens of the inclusive genus *Plumeria*.

I am very grateful to have had the opportunity of examining specimens of *Plumeria* and *Himatanthus* from several of the more important American and European herbaria. Since these genera are very poorly known, particularly in South America, exsiccatae have been freely cited by means of the following symbols: Botanischer Garten zu Berlin-Dahlem (B); Herbarium Boissier (BB) and Herbarium Delessert (D), Conservatoire Botanique, Geneva; Field Museum of Natural History, Chicago (FM); Gray Herbarium of Harvard University, Cambridge, Mass. (G); Botanisches Museum, Munich (M); Missouri Botanical Garden, St. Louis (MBG); Muséum National de l'Histoire Naturelle, Paris (MP); New York Botanical Garden, New York City (NY); Naturhistoriska Riksmuseet, Stockholm (S); Botanisch Museum, Rijks Universiteit, Utrecht (U); United States National Herbarium, Washington (US); Naturhistorisches Museum, Vienna (V). I wish to express my appreciation to the various curators and directors, and particularly to Dr. L. Diels and Dr. Fr. Markgraf, who located the type specimen of *Himatanthus* in the herbarium of Willdenow, and sent it to me for examination.

HIMATANTHUS Willd. char. emend.

Himatanthus Willd. ex R. & S. Syst. 5: 221. 1819.

Lactescent trees of small or medium stature. Stem essentially terete, usually with a rather broad pith becoming fistu-

lose, with fairly heavy wood, and rimose, flaky periderm scarred by the spiral cicatrices of fallen foliage; branches alternate to dichotomous. Leaves alternate, petiolate to sessile, penninerved, eglandular. Inflorescence terminal or pseudolateral, rather regularly thyriform, the secondary peduncles alternate and usually rather distant, bearing several to numerous handsome, white flowers, very conspicuously bracteate. Bracts large and showy, more or less petalaceous or foliaceous, caducous, bearing within numerous minute, persistent, pectinate, interpetiolar glands. Calyx essentially obsolete or consisting of 1–5 acute to acuminate, eglandular lobes of very unequal length and inconstant size, cleft nearly to the receptacle and never closely imbricated, without squamellae. Corolla salverform, the tube essentially straight, inappendiculate within, the limb actinomorphic, 5-parted, sinistrorsely convolute. Stamens 5, the anthers separate and free from the stigma, consisting of 2 wholly fertile, uniform thecae without protuberant bases; pollen granular. Carpels 2, strikingly subinferior, united at the apex by a common fusiform, 2-apiculate stigma; ovules many, several-seriate, borne upon an axile placenta which becomes corky and deciduous in the fruit. Nectaries absent. Follicles 2, apocarpous, usually somewhat compressed, dehiscing along the ventral suture, containing many dry, compressed, more or less concentrically winged seeds.

Type species: *Himatanthus articulata* (Vahl) Woodson, comb. nov. (*Plumeria articulata* Vahl, Eclog. Amer. 2: 20. 1798; *Himatanthus rigida* Willd. ex R. & S. Syst. 5: 221. 1819).

Trees of *Himatanthus* apparently vary considerably in height, collectors of flowering material reporting approximate dimensions from one to thirty meters. The boles are predominantly quite slender, however, and even the tallest specimens are said to attain but approximately 30 cm. near the base. The leaves vary considerably in size, ranging from 4 to 20 cm. in length within single species. As in the closely related genus *Plumeria*, the leaves apparently persist for only a relatively short time and occur chiefly toward the ends of the smaller branches. Unlike *Plumeria*, however, flowering specimens apparently never are found in a completely leafless condition.

The flowers are showy, invariably white in color, and of a rather waxy texture, as in *Plumeria*. Collectors report them to be pleasingly fragrant. The complete length of the corolla varies in general from 3 to 6 cm., the obovate to obovate-oblong lobes about equalling the length of the tube, which is predominantly 0.2 cm. in diameter at the base. The flowers are borne in a cincinnous manner at the swollen nodes of the compound inflorescence. At each node, ensheathing the secondary peduncle and the paired flowers, are borne two petalaceous, rather canaliculate, caducous bracts, which measure from 1 to 2.5 cm. in length, somewhat recalling the glumes of a grass spikelet, greatly enlarged.

The follicles are relatively broad, acuminate, and slightly, if at all, compressed. The length varies from as little as 6 cm. in *H. attenuata* to a maximum of 24 cm. in *H. articulata*. The seeds are greatly compressed, and are provided with a rather broad, more or less concentric, papery wing, much as those of the genus *Aspidosperma*. The seeds, which have a persistent endosperm (unlike those of *Aspidosperma*), are peltately affixed to the placenta, and are predominantly broadly ovate, varying from 2 to 8 cm. in length. At dehiscence of the follicle the placenta is shed with the seeds, and is found to be a most peculiar, corky, fusiform structure, as in *Plumeria*, ranging from 3 to 20 cm. in length, and from 0.7- to 1.5 cm. in diameter.

The large-bracted species of the inclusive genus *Plumeria*, which are now being relegated to *Himatanthus*, are an extremely difficult subject for taxonomic study at the present time. Apparently never abundant in the forest vegetation, but relatively few exsiccatae are available for study. The paucity of specimens obviously renders an evaluation of interspecific variability quite fallible: consequently the formulation of detailed descriptions in a study of this nature is impractical.

Under such conditions, the apparent absence of well-defined taxonomic criteria is particularly exasperating. Flower structure, including the anthers and stigmata, appears to offer no distinctions of merit which can be tested adequately from the present representation; and fruiting material is scant or lacking for the species. The calyx, which has been relied upon for

criteria by such investigators as Mueller-Argoviensis and Markgraf, is particularly inconstant.

The best indicators of relationship would appear to be the venation, texture, and shape of the leaves, notwithstanding the opinions of K. Schumann (in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895) and Markgraf (in Pulle, Fl. Surinam 4: 17. 1932). Although leaf characters have been employed almost exclusively in this purely tentative treatment, it probably is inevitable that their use may have to be modified greatly as additional material, so greatly needed, finds its way into our collections. It should be borne in mind by those who attempt to use the following key that it is offered quite provisionally, and is designed merely as a basis for the re-establishment of the genus *Himatanthus*.

KEY TO THE SPECIES

- a. Netted tertiary venation of leaves fine and dense, conspicuously verrucose in virtually its entirety upon the upper surface in desiccation.
 - b. Leaves lustrous, particularly above, the secondary venation relatively distant and broadly arcuate, the marginal vein rather poorly developed, deeply and irregularly sinuous.....1. *H. articulata*
 - bb. Leaves usually opaque, the secondary venation relatively close and essentially rectilinear, the marginal vein well developed and only very slightly sinuous.....2. *H. attenuata*
- aa. Netted tertiary venation of leaves fairly irregular and distant, more or less obscure upon the upper surface in desiccation.
 - b. Leaves manifestly petiolate, invariably glabrous.
 - c. Leaves firmly membranaceous to subcoriaceous, obovate-elliptic to oblanceolate-oblong.
 - d. Leaves broadest somewhat above the middle, tapering rather gradually, or obtuse; inflorescence corymbose or subcorymbose.....3. *H. Sucuuba*
 - dd. Leaves broadest near the tip, tapering rather abruptly, or broadly obtuse to rounded; inflorescence pyramidal.
 - e. Leaves more or less broadly obovate-elliptic, three to four times as long as broad, the tip obtuse or rounded to very shortly and obtusely acuminate.....4. *H. phagedaenica*
 - ee. Leaves oblanceolate-oblong, four to seven times as long as broad, the tip acutely subcaudate-acuminate to obtuse....5. *H. lancifolia*
 - cc. Leaves rather heavily coriaceous, broadly obovate to obovate-oblong.....6. *H. bracteata*
 - bb. Leaves sessile to subsessile, occasionally more or less pubescent.....7. *H. obovata*

1. *HIMATANTHUS articulata* (Vahl) Woodson, comb. nov.
Plumeria articulata Vahl, Eclog. Amer. 2: 20. 1798; Mgff.
in Pulle, Fl. Surinam 4: 16. 1932.
Himatanthus rigida Willd. ex R. & S. Syst. 5: 221. 1819.
Plumeria drastica Mart. in Spix & Mart. Reise Bras. 2:
547. 1828; A. DC. in DC. Prodr. 8: 393. 1844; Muell.-
Arg. in Mart. Fl. Bras. 6¹: 38. 1860.
Plumeria fallax Muell.-Arg. in Mart. Fl. Bras. 6¹: 38.
1860.
Plumeria microcalyx Standl. Field Mus. Publ. Bot. 4: 254.
1929.

PANAMA: SAN BLAS: Permé, April 3-10, 1928, *Cooper 642* (FM, NY, US);
DARIEN: Cana and vicinity, alt. 2000-6500 ft., April 17-June 8, *Williams 823*
(NY).

VENEZUELA: BOLIVAR: Ciudad Bolivar and vicinity, Febr.-March, 1921, *Bailey*
& *Bailey 1384* (MBG); Catalina, May, 1896 *Rusby & Squires 303* (B, D, G, M,
MBG, US); data incomplete, 1901-1902, *Passarge & Selwyn 835* (B).

BRITISH GUIANA: Wakefeon Creek, Pomeroon River, Oct., 1899, *Jenman 7968*
(B); data incomplete, *Schomburgk 403* (B).

DUTCH GUIANA: Sandrij I., Nov. 14-25, 1934, *Archer 2793* (MBG); Sectie O
(Waldreservat), date lacking, *Boschwezen 1394* (B); Brownsberg, Sept. 11, 1917,
Boschwezen 3257 (Bx, U); Boschreserve, Kaboerie, Aug. 27, 1920, *Boschwezen*
4956 (B, U); data incomplete, *Hostmann (& Kappler) 1311* (D, MP, S, U, V).

FRENCH GUIANA: Reservoir Hill, Matabon, vicinity of Cayenne, July 12, 1921,
Broadway 779 (G, US); Mana, 1896, *Sagot 894* (BB, MP, S); data incomplete,
1802, *Gabriel s.n.* (D, MP).

BRAZIL: AMAZONAS: Rio Quino Igarape, Sept., 1927, *Luetzelburg 21477* (M);
Igarape, Sept., 1927, *Luetzelburg 21547* (M); bei S. Marcos, Rio Branco, Jan.,
1909, *Ule 7829* (B); Maues, Dec., 1928, *Jard. Bot. Rio Jan. 21609* (B, S, US);
PARA: in colle Serra da Tabatinga prope Arrayollos inter Almerim et fl. Jary, April
29, 1923, *Ducke 17473* (S); Bragança, Jan. 10, 1923, *Ducke 17475* (B); Juruty
Velho, Dec. 19, 1926, *Ducke 21558* (B); Santarem, July 3, 1926, *Ducke 21596* (B,
US); Rio Trombetas infer., silva ad ripas inundatas Lago Salgado, Nov. 27, 1910,
Ducke 21785 (B); campos do Ariramba in reg. fl. Trombetas, Dec. 13, 1910, *Ducke*
21790 (B); Aramanahy, Jan., 1932, *Monteiro da Costa 236* (MBG); Ilha do Mos-
queiro, near Para, Nov. 3-9, 1929, *Killip & Smith 30660* (MBG, US); sylvis ad
Para, May, year lacking, *Martius s.n.* (M); in vicinibus Santarem, Nov.-Mart.,
1849-50, *Spruce 231* (B, G, M); Municipality of São Paulo de Olivença, basin of
creek Belem, Oct. 26-Dec. 11, 1936, *Krukoff 8786* (NY); MARANHÃO: Maracas-
sume River region, July 12, 1932, *Froes 1777* (D, MBG, S); Insula Mangunca, prope
Cururupu, Aug., 1914, *Lisboa 4785* (B, BB, S, US); ALAGOAS: Maceio-Penedo, alt.
100 m., March, 1932, *Werdermann 3020* (B); BAHIA: Serra do Sao Ignacio, Febr.,
1907, *Ule 7205* (B); Rio Preto, date lacking, *Zehntner 2082* (M); GOYAZ: Cam-

pinas, bei Duro, 1913, *Luetzelburg* 639 (M); DATA INCOMPLETE: "Habitat in interioribus prov. Minarum et Bahiensis ad Caitete, Malhada, Salgado aliisque locis," date lacking, *Martius s.n.* (M).

Occasionally the leaves of this species approach the subsessile condition of those of *H. obovata*, from which they may be distinguished, however, by the lustrous upper surface with its characteristically verrucose venation.

H. articulata forms rather slender trees 5 to 25 m. tall. Popular names are reported as "Santo Maria" (Bailey & Bailey), "Sucuúba" (Ducke, Huber), and "Jauahuba" (Lisboa).

2. *HIMATANTHUS attenuata* (Benth.) Woodson, comb. nov.

Plumeria attenuata Benth. in Hook. Jour. Bot. 3: 245. 1841; A. DC. in DC. Prodr. 8: 393. 1844; Muell.-Arg. in Mart. Fl. Bras. 6¹: 42. 1860.

Plumeria angustiflora Spruce, ex Muell.-Arg. in Mart. Fl. Bras. 6¹: 42. 1860, nom. nud. in synon.

Plumeria attenuata Benth. β . *obtusifolia* Muell.-Arg. in Mart. Fl. Bras. 6¹: 42. 1860.

Plumeria attenuata Benth. γ . *Malongo* Muell.-Arg. in Mart. Fl. Bras. 6¹: 42. 1860.

Plumeria Malongo Spruce, ex Muell.-Arg. Fl. Bras. 6¹: 42. 1860, nom. nud. in synon.

BRAZIL: AMAZONAS: Ilha de Jerusalem, Rio Negro, near mouth of Rio Cauabury, Dec. 18, 1930, *Holt & Blake* 561 (MBG, S, US); along Rio Negro, above Manaus, alt. 25 m., Oct. 14, 1929, *Killip & Smith* 30029 (MBG, US); Uypiranga prope Manaus, Dec. 21, 1923, *Kuhlmann* 21864 (B); in sylvis japurensibus, Dec.-Jan., year lacking, *Martius s.n.* (M); Ufer am Igarape, Manaus, Aug. 28, 1922, *Ray-mundo* 22088 (M); Rio Trombetas, Dec., 1849, *Spruce* 539 (MP); in vicinibus Barra, Dec.-Mart., 1850-51, *Spruce* 1004 (B, D, G, M, MP, ISOTYPES); prope Panure, Rio Uaupes, Dec., 1852, *Spruce* 2764 (Bx, MP); Cachoeira Grande, bei Manaus, Aug., 1910, *Ule* 8951 (B, D); Maues, ad ripas fluminis, Dec., 1928, *Jard. Bot. Rio Jan.* 21608 (B, BB, S, US); PARA: Lago de Faro, ripis inundatis, Jan. 4, 1920, *Ducke* 11401 (B); ad ripas fluminis das Trombetas et lacus Quiriquiry, Dec., 1849, *Spruce* 230 (M); ESPIRITO SANTO: data incomplete, *Glaziov* 9938 (MP).

Popular names of *H. attenuata* are reported as "Malongo" (Spruce) and "Sucuuba-rana" (Ducke). This species consists of slender trees 6-10 m. in height.

3. *HIMATANTHUS Sucuuba* (Spruce) Woodson, comb. nov.

Plumeria Sucuuba Spruce, ex Muell.-Arg. in Mart. Fl. Bras. 6¹: 40. 1860.

Plumeria floribunda Muell.-Arg. in Mart. Fl. Bras. 6¹: 40. 1860.

Plumeria tarapotensis K. Sch. ex Mgf. Notizblatt 11: 339. 1932.

PERU: JUNIN: Perene, Chanchamayo, Paucartambo, 1920, *Nordenskjold & Rospiglosi s.n.* (B); in Chanchamayo-Thal, Prov. Tarma, Dec., 1902, *Weberbauer 1927* (B); LORETO: Yurimaguas, lower Rio Huallaga, alt. 135 m., Aug. 22–Sept. 9, 1929, *Killip & Smith 27606* (MBG, US); Mishuyacu, near Iquitos, alt. 100 m., Oct.–Nov., 1929, *Klug 230* (US); Tocache, Huallaga, 1830, *Poeppig s.n.* (V); Chicoplaya, date lacking, *Tafalla s.n.* (B); Stromgebiet des Ucayali von 10° bis zur Mündung, Sept. 20, 1923, *Tessmann 3205* (B, D); Stromgebiet des Marañon von Iquitos aufwärts bis zur Santiago-Mündung am Pongo de Manseriche, Aug. 29, 1924, *Tessmann 3903* (B, D); Yurimaguas, March 18, 1926, *Tessmann 5512* (B, S); Tarapoto, Oct., 1902, *Ule 6473* (B, D); Rioja (westl. von Moyobamba), Sept. 8, 1904, *Weberbauer 4701* (B, D); lower Rio Huallaga, alt. 155–210 m., Oct.–Nov., 1929, *Williams 3988* (US); SAN MARTIN: alto Rio Huallaga, Dec., 1929, *Williams 6559* (MBG).

BOLIVIA: BENI: Rurrenabaque, alt. 1000 ft., June 1–7, 1921, *Rusby 1558* (US); LA PAZ: Tipuani-Guanai, Dec., 1892, *Bang 1679* (B, BB, D, G, M, MBG, NY, US); Tumupasa, Dec. 10, 1901, *Williams 401* (US); SANTA CRUZ: Montes de Buena-vista, Prov. Sara, April 23, 1916, *Steinbach 2048* (B); Rio Surutu, Prov. Sara, Dec. 27, 1924, *Steinbach 6827* (B, D, MBG, S).

BRAZIL: AMAZONAS: Manaos, Dec. 8, 1927, *Ducke 21606* (B); Rio Jauary, Oct. 20, 1927, *Ducke 21607* (B, US); Municipality Humayta, on plateau between Rio Livramento and Rio Ipixuna, Nov. 7–18, 1934, *Krukoff 7195* (MBG); near mouth of Rio Embira (tributary of Rio Tarauca), June 13, 1933, *Krukoff 4787* (FM, NY); Municipality São Paulo de Olivença, June, 1936, *Krukoff 7846* (NY); near Palmares, Municipality São Paulo de Olivença, Sept. 11–Oct. 26, 1936, *Krukoff 8413* (NY); basin of creek Belem, Municipality of São Paulo de Olivença, Oct. 26–Dec. 11, 1936, *Krukoff 8926* (NY); Ega, date lacking, *Martius s.n.* (M); prope Barra, Oct., 1851, *Spruce 1848* (B, Bx, TYPE, G, MP); Panure, Maupes, date lacking, *Spruce 2794* (MP); Manaos, Jan., 1901, *Ule 5385* (B, D); MATTO GROSSO: near Tabajara, upper Machado River region, Nov., Dec., 1931, *Krukoff 1463* (B, D); PARA: Rio Erepeuru, affl. Trombetas, ad ripas cataractae Cachoeira Troneo, Oct. 20, 1913, *Ducke 21783* (B); ACRE: near mouth of Rio Macauhan (tributary of Rio Yaco), Aug. 29, 1933, *Krukoff 5689* (FM, NY).

Trees of this species are said to attain a height of 30 m. (Krukoff), although other collectors report flowering specimens of only 2 m. Popular names are reported as “Sucuuba”

(Spruce, Krukoff), "Cipoal" (Krukoff), "Leche-leche" (Steinbach), and "Bellaku-Kaspi" (Tessmann).

4. *HIMATANTHUS phagedaenica* (Mart.) Woodson, comb. nov.

Plumeria phagedaenica Mart. in Spix & Mart. Reise Bras. 3: 1128. 1831; A. DC. in DC. Prodr. 8: 394. 1844; Muell.-Arg. in Mart. Fl. Bras. 6¹: 37. 1860; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Plumeria ambigua Muell.-Arg. in Mart. Fl. Bras. 6¹: 37. 1860.

Plumeria Martii Muell.-Arg. in Mart. Fl. Bras. 6¹: 37. 1860.

Plumeria speciosa Muell.-Arg. in Mart. Fl. Bras. 6¹: 36. 1860; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Plumeria floribunda Muell.-Arg. β . *crassipes* Muell.-Arg. in Mart. Fl. Bras. 6¹: 40. 1860.

Plumeria floribunda Muell.-Arg. γ . *calycina* Muell.-Arg. in Mart. Fl. Bras. 6¹: 41. 1860.

Plumeria floribunda Muell.-Arg. δ . *acutifolia* Muell.-Arg. in Mart. Fl. Bras. 6¹: 41. 1860.

Plumeria fallax Muell.-Arg. in Mart. Fl. Bras. 6¹: 38. 1860, as to specimens cited, in part.

Plumeria lancifolia Muell.-Arg. β . *major* Muell.-Arg. in Mart. Fl. Bras. 6¹: 41. 1860.

Plumeria lancifolia Muell.-Arg. γ . *microphylla* Muell.-Arg. in Mart. Fl. Bras. 6¹: 41. 1860.

BRAZIL: AMAZONAS: sylvis ad Rio Cachoeira prope Barra do Rio Negro, Oct., year lacking, *Martius* 2778 (M, TYPE); PERNAMBUCO: Tapera, Jan., 1929, *Pickel* 1882 (B); Cajueiro nordwestl. Recife, c. 100 m. alt., Febr., 1932, *Werdermann* 2785 (B); data incomplete, *Ridley Lea & Ramage s.n.* (B, S); BAHIA: sylvis Catingas ad Feira de Conceição, Febr.-Mart., year lacking, *Martius* 2252 (M); Vittoria-Bahia, date lacking, *Sello s.n.* (B); data incomplete, *Blanchet* 223 (D, MP); *Blanchet* 929 (D); *Lhotsky* 4 (B); MINAS GERAES: data incomplete, 1831, *Ackermann s.n.* (Bx); RIO DE JANEIRO: data incomplete, *Glaziov* 11175 (B); DATA INCOMPLETE: *Ackermann s.n.* (B); *Link s.n.* (B); *Pohl s.n.* (Bx); *Sello* 32 (Bx); *Sello s.n.* (B).

Reported by collectors to form high trees.

5. *HIMATANTHUS lancifolia* (Muell.-Arg.) Woodson, comb. nov.

Plumeria lancifolia Muell.-Arg. in Mart. Fl. Bras. 6¹: 41. 1860.

Plumeria lancifolia Muell.-Arg. β . *major* Muell.-Arg. in Mart. Fl. Bras. 6¹: 41. 1860, as to specimens cited, in part.

BRAZIL: ESPIRITO SANTO: Rio Doce, Febr., 1907, *Luetzelburg* 7222 (M); MINAS GERAES: Serra dos Vertentes, près Oliveira, Aug. 22, 1882, *Glaziov* 14069 (B, MP); s.e. corner of Agricultural College grounds, Viçosa, alt. 590 m., Dec. 19, 1929, *Meria* 4136 (MBG); hill northwest of director's house, alt. 675 m., Dec. 15, 1930, *Meria* 5408 (MBG); data incomplete, *St.-Hilaire* 42 (MP); RIO DE JANEIRO: Corvo-cado et Pain de S., 1858, *Guillos* s.n. (MP); Vista Chinez, March, 1917, *Hoehne* 24608 (B); Canta Gallo, 1859, *Peckolt* 58 (Bx, TYPE); sylvarum margines per Serra do Mar, date lacking, *Martius* s.n. (M); data incomplete, *Glaziov* 640 (Bx); *Mosen* 2533 (S); *Widgren* 828 (S, US); DATA INCOMPLETE: *Freyreiss* s.n. (S); *Glaziov* 20409 (B); *Pohl* 1837 (Bx); *Sello* 1273 (B).

I suspect that this species may ultimately prove to be but a variety of *H. phagedaenica*.

6. *HIMATANTHUS bracteata* (A. DC.) Woodson, comb. nov.

Plumeria bracteata A. DC. in Prodr. 8: 394. 1844; Muell.-Arg. in Mart. Fl. Bras. 6¹: 36. *pl. 11, fig. 2.* 1860.

Plumeria revoluta Huber, Bull. Soc. Bot. Genève II. 6: 200. 1915.

BRITISH GUIANA: Malali, Demerara River, Oct. 30–Nov. 5, 1922, *Cruz* 2743 (G); Barima River, Northwest District, March 19–22, 1923, *Cruz* 3361 (G); dry sand-hills east of Rockstone, July 22–30, 1921, *Gleason* 777 (G).

DUTCH GUIANA: savannah near Brownsberg, Nov. 13, 1933, *Lanjouw* 1252 (B).

BRAZIL: AMAZONAS: infra cataractas Camanaos, Nov. 22, 1929, *Ducke* 22404 (B); Üfer des Igarape, Oct. 6, 1928, *Luetzelburg* 22351 (M); Igapo, Rio Negro, Oct. 9, 1928, *Luetzelburg* 22903 (M); Fl. Uaupes, Nov., 1852, *Spruce* 2721 (MP); PARA: inter Almeirim et Prainha, Oct. 6, 1919, *Ducke* 11399 (B); Pampinas de l'Achipica, Rio Trombetas, Oct. 15, 1913, *Ducke* 14987 (US); PERNAMBUCO: data incomplete, *Paulay* s.n. (V); BAHIA: data incomplete, *Blanchet* 13 (MP, TYPE).

I suspect that *H. bracteata* and *H. articulata* hybridize in the Guianas and northeastern Brazil. Several specimens suggesting this possibility bear leaves with the texture of *H. bracteata* but with the verrucose venation of *H. articulata*, and have been assigned, consequently, to the latter species in citation.

7. *HIMATANTHUS obovata* (Muell.-Arg.) Woodson, comb. nov.

Plumeria obovata Muell.-Arg. in Mart. Fl. Bras. 6¹: 40. 1860.

var. *typica*.

Plumeria Warmingii Muell.-Arg. in Warming, Kjoeb. Vidensk. Meddel. p. 99. 1869.

Plumeria oligoneura Malme, Arkiv f. Bot. 21A⁶: 6. 1927 (see note below).

Plants wholly glabrous throughout.

BRAZIL: BAHIA: data incomplete, *Luschnath* 190 (B); GOYAZ: data incomplete, *Glaziou* 21736, in part (B); MATTO GROSSO: Santa Ana da Chapada, Sept. 24, 1902, *Malme* 2375 (S); MINAS GERAES: inter Uberava et Melancias, Nov. 29, 1848, *Regnell III* 867, in part (S, US); Lagoa Santa, 1870, *Warming* s.n. (D); data incomplete, *Claussen* 330 (G, S); *St.-Hilaire* 576 (MP); SAO PAULO: inter Canna Verde et S. Joao de Jaguary, May 5-8, 1848, *Regnell III* 867, in part (S); inter Franca et Uberava, July, 1848, *Regnell III* 867, in part (S); Cajuru, March, 1857, *Regnell III* 867, in part (S); DATA INCOMPLETE: *Glaziou* 19628 (B, MP); *Pohl* s.n. (Bx); "S. Luzia Corumba, Villa Boa," *Pohl* s.n. (M); *Schwake* 8165 (B); *Sello* 1643 (B, Bx); "Bresil Central," *Weddell* 2508 (MP).

BOLIVIA: data incomplete, *d'Orbigny* s.n. (MP).

var. *puberula* (Muell.-Arg.) Woodson, comb. nov.

Plumeria puberula Muell.-Arg. in Mart. Fl. Bras. 6¹: 39. 1860.

Plumeria velutina Muell.-Arg. in Mart. Fl. Bras. 6¹: 38. 1860.

Plumeria Hilariana Muell.-Arg. in Mart. Fl. Bras. 6¹: 39. 1860.

Plumieria latifolia Pilger, in Engl. Bot. Jahrb. 30: 183. 1901.

Leaves and young stem more or less densely velutinous-puberulent to glabrate.

BRAZIL: GOYAZ: central plateau, 1894-95, *Glaziou* 21736, in part (D); MATTO GROSSO: Cuyaba, Nov., 1893, *Malme* 1120 (S); same place, July 4, 1902, *Malme* s.n. (S); Serradao bei Cuyaba, Febr. 15-20, 1899, *Pilger* 198 (B); MINAS GERAES: data incomplete, 1816-1821, *St.-Hilaire* s.n. (MP).

The type specimen of *Plumeria oligoneura* Malme (*Malme* 2375, in herb. Stockholm) suggests hybridity with *H. Sucuuba*, since the leaves have short petioles, venation much as in *H.*

Succuba, and general outline intermediate between *Succuba* and *obovata*. The specimen certainly is not worthy of specific rank upon the basis of our present knowledge of the genus.

PLUMERIA L. char. emend.

Plumeria [Tourn.] L. Sp. Pl. ed. 1. 1: 209. 1753; Gen. Pl. ed. 5. 99. 1754; A. DC. in DC. Prodr. 8: 389. 1844, in part; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895, in part; Britton, Bull. Torrey Bot. Club 42: 503. 1915.

Lactescent trees of small or medium stature. Stems terete or essentially so, usually with a broad pith becoming fistulose, with light wood and rimose, corky periderm scarred by the spiral cicatrices of fallen leaves; branches dichotomous to alternate. Leaves alternate, petiolate to sessile or subsessile, penninerved, eglandular. Inflorescence terminal or pseudolateral, fastigiately thyriform, usually greatly congested, bearing few to numerous handsome flowers, very inconspicuously bracteate. Bracts small, scarious, caducous. Calyx 5-parted, the lobes equal to subequal, cleft nearly to the receptacle, closely imbricated, glandular at the tips, but without squamellae at the base within. Corolla salverform, the tube essentially straight, exappendiculate within, the limb actinomorphic, 5-parted, sinistrorsely convolute. Stamens 5, the anthers separate and free from the stigma, consisting of 2 wholly fertile, basally protuberant thecae; pollen granular. Carpels 2, strikingly subinferior, united at the apex by a common, fusiform, 2-apiculate stigma; ovules many, several-seriate, borne upon an axile placenta which becomes corky and deciduous in the fruit. Nectaries absent. Follicles 2, apocarpous, stout, terete or essentially so, dehiscing along the ventral suture, containing many dry, compressed, basally winged seeds.

Type species: *Plumeria rubra* L. Sp. Pl. ed. 1. 1: 209. 1753.

Founded as a tribute to Charles Plumier, the pioneer systematist of the tropical New World flora, the genus was spelled *Plumeria* by both Tournefort and Linnaeus, as well as by such subsequent authors as A. de Candolle, Bentham, and Baillon. The spelling *Plumiera* also was used by Linnaeus,

however, in the 'Philosophia' (31. 1751), and followed by Adanson, C. Kuntze, and K. Schumann, influenced doubtless by Burmann's Latinization of the personal name of the illustrious Minim as "Plumierius." A still further change to *Plumieria* was made by Scopoli (Introductio. 155. 1777). Use of all three variants has been widespread, even by a single author. More recently Urban (in Fedde, Repert. Spec. Nov. **14**: 341. 1916) has come to the defense of the original spelling *Plumeria*, pointing out that it has both priority and the sanction of correct etymology, since the correct Latinization of Plumier's name should be "Plumerius."

An evaluation of the species of *Plumeria* by students unable to gain an extensive knowledge of the plants in the field, among whom the present writer must be counted, is attended by several difficulties. The first of these is the paucity of morphological characters in the flowers and fruits, the relatively few of which have been either unknown to most authors, or ignored by them.

The color of the corolla apparently is always white "with a yellow eye" in the species indigenous to the Antilles and northern South America. But the inclusive *P. rubra* L. (as interpreted in this revision), which is supposedly the only species indigenous to Central America, demonstrates a bewildering variety of flower color ranging from pure white to uniform deep yellow or rose, together with various combinations of shades. This diversity has prompted specific segregation to a surprising extent, since the plants have been admired so greatly and are so frequent in cultivation. To the present writer, however, color variations in *P. rubra* are certainly not specific, because of the lack of accompanying characters; and such segregation is rendered extremely impractical as well by the loss or change of flower color in desiccation. In the revision which follows a few outstanding color variations are accorded formal rank for the use of those who desire some distinction in the matter.

In the absence of other morphological characters, several authors, notably Britton and Urban, have attempted extensive segregation of the *Plumerias* of the Antilles upon the bases of

leaf shape, size, and indument, which certainly are extremely diversified within certain limits. A difficulty encountered in such characters is that the foliage is very deciduous, rendering herbarium specimens imperfect in a surprising number of cases. Then too, *Plumerias* are very prone to bloom in a leafless condition.

There can be little doubt that the leaf outline of the Antillean species of *Plumeria* is much more variable than the describers of some species apparently have realized. If one arranges in a single series a suite of leaves each of which has been taken from type specimens of as many species from the *P. obtusa* L. complex described by Grisebach, Urban, Britton, and others, the difficulty of segregation upon such characters at once becomes apparent. Hence slight variations in leaf outline have been discounted greatly in the present revision. Since the presence or absence of indument is a character easily perceived and in favor with those who prefer their taxonomic entities "cut fine," *P. obtusa* has been divided into a glabrous variety and one which is more or less pubescent upon the lower leaf surface, but this also with reluctance.

Although known under a variety of aboriginal names, the most widespread popular name for the cultivated *Plumerias* in use by Europeans is "Frangipani" or "Frangipanier." Sir J. J. Smith (in Rees, 'Cyclopaedia,' 1810) discusses the provenience of this name as follows: "The French name of this genus, *Frangipanier*, is rather remarkable. It is said to allude to its fragrance, *Frangipani* being a sort of perfume so-called in France from its inventor, an Italian, of the Frangipani family, so conspicuous in the Roman disturbances of the twelfth century." The odor was described by Jacquin as being "perhaps the sweetest of any plant living," well-merited praise, although individuals occasionally are encountered which are practically scentless. The fragrance, as well as the abundance of waxy, beautifully tinted flowers, apparently caused the *Plumerias* to be prized by the Indians long before the advent of the Spaniards, and garlands are still used in tropical America as nosegays and head-dresses and to decorate altars. Transplanted by admiring Europeans, *P. rubra* now is found

in cultivation throughout the world's tropics, vying in popularity even with the ubiquitous *Nerium Oleander*.

KEY TO THE SPECIES

- a. Corolla subinfundibuliform, the tube gradually dilating above the insertion of the stamens to an orifice about twice the diameter of the base.
 - b. Leaves definitely petiolate, obovate-elliptic to oblanceolate, not pandurate or cochleate; corolla-lobes fully contorted in the bud, strikingly spiral in aestivation; Colombia; British Guiana.....1. *P. inodora*
 - bb. Leaves subsessile, obovate-oblong, more or less pandurate or cochleate; corolla-lobes about half convolute in the bud, longitudinal in aestivation, or scarcely spiral; Colombia; Venezuela; Martinique....2. *P. pudica*
- aa. Corolla strictly salverform, the orifice of the tube about equalling the diameter of the base, or slightly narrower.
 - b. Secondary venation of leaves entering the midrib at a more or less conspicuously decurrent, narrowly acute angle, at least in part; aestivation of corolla-lobes conspicuously spiral.
 - c. Leaves conspicuously petiolate, subcoriaceous, with a conspicuous marginal vein, secondary and tertiary venation more or less immersed upon the upper surface; flowers white, yellow, rose, or particolored; Central America generally, frequently cultivated in the Antilles, South America, and elsewhere in the tropics and subtropics...3. *P. rubra*
 - cc. Leaves subsessile, membranaceous, without a well-developed marginal vein, secondary and tertiary venation extremely pronounced upon both surfaces; flowers white "with a yellow eye"; Hispaniola....
.....7. *P. subsessilis*
 - bb. Secondary venation of leaves entering the midrib directly; aestivation of corolla-lobes longitudinal, or scarcely spiral.
 - c. Leaves obovate to obovate-oblong, rounded, emarginate, or very broadly obtuse at the apex, rarely very shortly and abruptly acuminate-submucronulate, coriaceous to subcoriaceous, rarely firmly membranaceous, secondary veins anastomosing distally to form a well-developed marginal vein; Bahama Islands; Cuba; Hispaniola; Jamaica; Puerto Rico; locally in Yucatan and British Honduras....
.....4. *P. obtusa*
 - cc. Leaves lanceolate or oblong-lanceolate to subfiliform, narrowly and gradually acute to acuminate at the apex, firmly membranaceous to subcoriaceous, secondary veins anastomosing distally but not forming a well-developed marginal vein.
 - d. Leaves linear-lanceolate to subfiliform, 0.1–1.0 cm. broad, firmly membranaceous, wholly glabrous; Cuba.....5. *P. filifolia*
 - dd. Leaves lanceolate to oblong-lanceolate, 1–4 cm. broad, subcoriaceous, the margins very characteristically "puckered-revolute" in desiccation, usually densely pubescent beneath; Puerto Rico; Virgin Islands; Lesser Antilles.....6. *P. alba*

(Attention is called to the discussion of hybridization, as an aid to the determination of anomalous specimens, particularly those of Hispaniola.)

1. *PLUMERIA INODORA* Jacq. Select. Stirp. Amer. Hist. 1: 36. 1763.

Plumeria alba L. var. β . *fragrans* HBK. Nov. Gen. 3: 230. 1819.

Plumiera alba L. var. *fragrantissima* G. Don, Gen. Hist. 4: 94. 1838.

Plumiera alba L. var. *inodora* (Jacq.) G. Don, Gen. Hist. 4: 94. 1838.

COLOMBIA: EL VALLE DE CAUCA: Río Bugalagrande, Central Cordillera, alt. 1400 m., June 15, 1930, *Dryander 425* (B); CUNDINAMARCA: Girardot, July, 1930, *Arbelaez 358* (US); MAGDALENA: Barranquilla and vicinity, Usiacuri, alt. 250 m., July, 1927, *Elias 269* (MBG, US); Santo Tomas, July, 1932, *Elias 1009* (FM, MBG, US); Santa Marta, April 11, 1926, *Schultze 319* (B); Santa Marta, 1898–1899, *Smith 1650* (D, MBG, US).

BRITISH GUIANA: Assakatta, Northwest District, Sept. 18–28, 1923, *Cruz 4285* (FM, G); Comaca, Moruka River, Pomeroun District, Aug. 26, 1921, *Cruz 1068* (G).

The resurrection of Jacquin's *P. inodora* at this late date undoubtedly is difficult, since authentic herbarium specimens are unavailable. However, the short original diagnosis of plants growing at Cartagena appears to apply fairly well to our plants, and the statement “folia Plumeriae rubrae; flores congeneribus duplo majores” has particular bearing, as plants referable to *P. inodora* as interpreted here almost invariably have been relegated to *P. rubra*, even by certain specialists in Apocynaceae. Bro. Elias reports the common name in Colombia as “Florón.”

2. *PLUMERIA PUDICA* Jacq. Select. Stirp. Amer. Hist. 1: 37. 1763.

Plumiera caracasana Johnston, Contr. U. S. Nat. Herb. 12: 108. 1908.

Plumeria cochleata Blake, Contr. Gray Herb. n. s. No. 53: 47. 1918.

COLOMBIA: MAGDALENA: Dibulla, between sea-level and 400 m. alt., July, 1932, *Seifriz 221* (US); Santa Marta, Aug., 1844, *Goudot s.n.* (MP).

VENEZUELA: FALCON: between Coro and Alta Gracia, May 1, 1917, *Curran & Haman 742* (G, US); vicinity of La Boca, May 1, 1917, *Curran & Haman 742A* (G); Cabo Blanco, June 11, 1917, *Curran & Haman 934* (G, US); hills of Cabo Blanco, Aug. 7, 1927, *Pittier 12426* (B, D, M, MBG, US); Cerro Sta. Ana, Para-

guana Pen., April 12, 1917, *Curran & Haman 601A* (G); DISTR. FEDERAL: La Guaira, July 13, 1900, *Robinson & Lyon s.n.* (US); between Caracas and La Guayra, alt. 1500 ft., Aug. 16, 1855, *Fendler 1026* (G); Curucuti, near Maiquetia, May 15–June, 1922, *Pittier 10353* (B, D, G, US); NUEVA ESPARTA: El Valle, Margarita, July 24, 1901, *Miller & Johnston 163* (G); same locality and date, *Miller & Johnston 100* (G, MBG, US).

MARTINIQUE: Fort de France, St. Pierre, cultivé sur les cemetières, 1885, *Duss 336* (NY, US).

Much the same difficulties attend the present interpretation of *P. pudica* Jacq. as that of *P. inodora*. In relegating the cited specimens to the former, disused almost continuously since its publication, particular emphasis has been placed upon the description of the leaves ("Folia oblonga, frondosa, plana, venosaque. . .") and the simple statement of its provenience as from Curaçao, within the general distribution of the species as here interpreted. Conscientious objection may arise in some quarters against the resurrection of a somewhat ambiguous name in place of two such as *P. caracasana* and *P. cochleata* which are established with extant type specimens; but I am personally opposed to the disregard of any name proposed in such an objective work as that of Jacquin's 'Stirpes' when any positive evidence whatsoever is available for interpretation.

3. PLUMERIA RUBRA L. Sp. Pl. ed. 1. 1: 209. 1753; A. DC. in DC. Prodr. 8: 390. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Plumeria acuminata Ait. Hort. Kew. 2: 70. 1789; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Plumieria purpurea R. & P. Fl. Peruv. 2: 20. pl. 137. 1799; A. DC. in DC. Prodr. 8: 390. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Plumieria incarnata R. & P. Fl. Peruv. 2: 20. pl. 138. 1799; A. DC. in DC. Prodr. 8: 390. 1844.

Plumieria tricolor R. & P. Fl. Peruv. 2: 20. pl. 139. 1799; A. DC. in DC. Prodr. 8: 390. 1844.

Plumieria carinata R. & P. Fl. Peruv. 2: 21. pl. 140. 1799; A. DC. in DC. Prodr. 8: 390. 1844.

Plumieria bicolor R. & P. Fl. Peruv. 2: 21. pl. 141. 1799; A. DC. in DC. Prodr. 8: 391. 1844.

- Plumieria lutea* R. & P. Fl. Peruv. **2**: 21. pl. 142. 1799;
A. DC. in DC. Prodr. **8**: 391. 1844; K. Sch. in Engl. &
Prantl, Nat. Pflanzenfam. **4**²: 136. 1895.
- Plumieria acutifolia* Poir. Encycl. Suppl. **2**: 667. 1812;
A. DC. in DC. Prodr. **8**: 392. 1844.
- Plumieria mollis* HBK. Nov. Gen. **3**: 230. 1819; A. DC. in
DC. Prodr. **8**: 393. 1844.
- Plumieria mexicana* Lodd. Bot. Cab. pl. 1024. 1825.
- Plumieria Lambertiana* Lindl. Bot. Reg. pl. 1378. 1830;
A. DC. in DC. Prodr. **8**: 391. 1844; K. Sch. in Engl. &
Prantl, Nat. Pflanzenfam. **4**²: 136. 1895.
- Plumieria Milleri* G. Don, Gen. Hist. **4**: 93. 1838.
- Plumieria arborescens* G. Don, Gen. Hist. **4**: 93. 1838.
- Plumieria Kerrii* G. Don, Gen. Hist. **4**: 93. 1838.
- Plumieria incarnata* R. & P. β . *Milleri* (G. Don) A. DC. in
DC. Prodr. **8**: 390. 1844.
- Plumieria megaphylla* A. DC. in DC. Prodr. **8**: 391. 1844.
- Plumieria acutifolia* Poir. β . *Gasparrini* A. DC. in DC.
Prodr. **8**: 393. 1844.
- Plumieria Jamesoni* Hook. Bot. Mag. pl. 4751. 1853;
K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 136.
1895.
- Plumieria loranthifolia* Muell.-Arg. in Mart. Fl. Bras. **6**¹:
42. 1860; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam.
4: 136. 1895.

MEXICO: BAJA CALIFORNIA: San Jose del Cabo, Sept. 24, 1890, *Brandegge* 358 (G, US); Valle Flojo to El Pescadero, alt. 200–500 ft., Dec. 26, 1905, *Nelson & Goldman* 7351 (MBG, US); CAMPECHE: Conhuas, Febr. 23, 1932, *Lundell* 1375 (NY, US); CHIAPAS: near Chicharras, alt. 6000 ft., Febr., 12–15, 1896, *Nelson* 3804 (US); San Vicente, April 16, 1904, *Goldman* 856 (US); CHIHUAHUA: data incomplete, 1885, *Palmer* 231 (G, US); COLIMA: Colima, July 2, 1892, *Jones* 351 (US); Manzanillo, March 2–18, 1891, *Palmer* 1394 (G, US); GUERERRO: Las Seibas, alt. 250 m., May 24, 1898, *Langlassé* 196 (B, D, G, US); Acapulco and vicinity Oct., 1894–March, 1895, *Palmer* 407 (US); HIDALGO: on dry cliffs near Tula, alt. 6800 ft., May 5, 1898, *Pringle* 6830 (BB, Bx, D, G, M, MBG, MP, NY, S, US); prope Huejatla, April, 1888, *Seler & Seler* 662 (B, G); Ixmiquilpan, May, 1905, *Purpus* 1260A (MBG, NY); JALISCO: Chiquilistlan, May 30, 1892, *Jones* 350 (MBG, US); slopes of barranca near Guadalajara, May–Sept., 1891, *Pringle* 3712 (B, BB, Bx, G, M, MBG, MP, NY, S, US); Baranca, near Guadalajara, June, 1886, *Palmer* 137 (BB, G, NY, US); MORELOS: lava fields near Cuer-

navaca, alt. 5000 ft., May 11, 1898, *Pringle 6866* (B, BB, Bx, D, G, M, MBG, MP, NY, S, US); prope Hacienda Gaspar, Distr. Cuernavaca, Dec., 1877, *Seler & Seler 356* (B); San Antonio, Nov. 12, *Fröderstrom & Hulten 79* (S); NAYARIT: Acapomete, June, 1897, *Rose 1486* (G, MBG, US); OAXACA: Huanchilla, alt. 1200 m., June, 1901, *Conzatti & Gonzalez 1209* (G); Rio Seco, alt. 3300 ft., June 1, 1895, *Smith 387* (G); Cerro Caballito Blanco, alt. 1700 m., April 20, 1920, *Conzatti 3934* (US); Cuesta de Quiotepec, alt. 1100 m., April 23, 1919, *Conzatti 3554* (US); Cerro Concordia, alt. 800–1000 m., April 17, 1933, *Morton & Makrinius 2728* (US); vicinity of Comaltepec, alt. 1800–3000 ft., July 30–31, 1894, *Nelson 935* (US); six miles above Domingullo, alt. 4500–5500 ft., Oct. 30, 1894, *Nelson 1879* (US); near Reyes, alt. 5800–6700 ft., Oct. 20, 1894, *Nelson 1779* (G); Villa Alta, Cerro de Yalina, alt. 1500 m., June, 1899, *Conzatti 962* (G); Sta. Catarina, 1910, *Olssen & Seffer s.n.* (MBG); Hacienda "Los Bocas de Concepcion," Aug. 22, 1909, *Olssen & Seffer s.n.* (MBG); PUEBLA: Santa Lucia, June, 1908, *Purpus 3240* (MBG); Tehuacan, June, 1905, *Purpus 1260* (NY); region d'Orizaba, May 12, 1865, *Bourgeau 2415* (BB, Bx, G, MP, S); QUERETARO: data incomplete, 1910–13, *Aguil 10343* (US); SINALOA: Mazatlan, June 17–19, 1897, *Rose 1392* (US); Zapote, 1923, *Ortega 5202* (US); dry hills, vicinity of San Blas, March 22, 1910, *Rose Standley & Russell 13234* (US); SONORA: Sierra de Alamas, March 14, 1910, *Rose Standley & Russell 12852* (US); VERA CRUZ: Papantla, June, 1841, *Liebman 11911* (G, US); YUCATAN: La Vega, March 14–26, 1901, *Goldman 629* (US); forest, Chichen Itza, June 20, 1932, *Steere 1436* (MBG).

GUATEMALA: AMATITLAN: Laguna Amatitlan, alt. 3900 pp., Febr., 1890, *Smith 1920* (US); EL PROGRESO: Barranquillo, April 21, 1920, *Popenoe 981* (US); ESCUINTLA: Escuintla, alt. 1100 pp., March, 1890, *Smith 1893* (G, US); IZABAL: vicinity of Quirigua, alt. 75–225 m., May 15–31, 1922, *Standley 24318* (G, US); PETEN: occupied clearing, La Libertad, April 26, 1933, *Lundell 3023* (MBG, S); RETALHULEU: Caballo Blanco, alt. 250 pp., April, 1892, *Smith 2767* (G, US); San Felipe, alt. 2050 pp., April, 1892, *Smith 2771* (NY, US); SANTA ROSA: Santa Rosa, alt. 2500 pp., May, 1892, *Heyde & Lux 2959* (G, US); SUCHITEPEQUEZ: Cuyotenango, alt. 1100 pp., April, 1892, *Smith 2768* (G, NY, US).

HONDURAS: COMAYAGUA: cut-over valley lands, San Luis, alt. 2500 ft., May 11, 1933, *Edwards 599* (US); SANTA BARBARA: San Pedro Sula, alt. 1200 pp., Aug., 1888, *Thieme 5344* (B, BB, D, G, M, NY, US).

BRITISH HONDURAS: Roaring Creek, Aug., 1929, *Lundell 468* (MBG, US); El Cayo and vicinity, March–June, 1933, *Chanek 37* (MBG).

EL SALVADOR: vicinity of San Salvador, alt. 650–850 m., March 30–April 24, 1922, *Standley 23617* (NY, US); Huizucar, April, 1929, *Calderon 2527* (FM, US).

NICARAGUA: CHINANDEGA: Chinandega, Jan. 20, 1903, *Baker 69* (G, US); GRANADA: env. de Granada, Febr., 1870, *Levy 427* (BB, D); MANAGUA: Momotombo, June, 1895, *Smith 139* (G, MBG, NY, US); MASAYA: southwestern slopes of Santiago Volcano, near Masaya, alt. 300–480 m., July 5, 1923, *Maxon 7666* (US).

COSTA RICA: GUANACASTE: pentes rocheuses des collines de Nicoya, Jan., 1900, *Tonduz 13681* (B, BB, G, US); sur les rochers de la Baie de Salinas, July, 1890, *Pittier 2622* (BB, Bx, US); autour de maisons à Santo Domingo de Golfo Dulce, May, 1896, *Tonduz 9919* (Bx, US).

PANAMA: CHIRIQUÍ: vicinity of San Felix, alt. 0–120 m., Dec., 1911, *Pittier 5289* (US); COCLÉ: Penonomé and vicinity, alt. 50–1000 m., Febr. 23–March 22,

1908, *Williams 620* (NY); PANAMÁ: Taboga Island, Jan. 25, 1935, *Allen 133* (MBG); CANAL ZONE: Corozal, Jan. 16, 1922, *Greenman & Greenman 5212* (MBG).

I believe that the foregoing specimens approximate the natural distribution of *P. rubra*, augmented considerably, no doubt, by cultivation and escape. The specimens following, I believe to be the result of cultivation, and are of interest chiefly from the standpoint of dynamic floristics of cultivated ruderals. Beside the following records from America, there are also many herbarium records of the species from the Philippine Islands, Hawaii, Formosa, Indo-China, India, and Africa, which are obviously without the general scope of this paper.

UNITED STATES: FLORIDA: Miami, cultivated, Aug. 27, 1929, *Irving s.n.* (US).

BERMUDA: Somerset Island, planted, Aug. 27–Sept. 21, 1912, *Brown & Britton 1009* (NY).

BAHAMA ISLANDS: ANDROS: Mastic Pt., June, 1890, *Northrop & Northrop 601* (B, NY); Mangrove Cay, 1904, *Bryant 6* (G).

CUBA: CAMAGUEY: Camaguey, gardens, April 2–7, 1912, *Britton Britton & Cowell 13218* (NY, US); HAVANA: Santiago de la Vega, 1904, *Hermann 234* (FM, NY); ORIENTE: prope villam Monte Verde, Jan.–July, 1859, *Wright s.n.* (G); SANTA CLARA: Soledad, Cienfuegos, Aug. 20, 1927, *Jack 5320* (NY).

HISPANIOLA: HAITI: vicinity of St. Louis du Nord, cemetery, April 7, 1929, *Leonard & Leonard 14597* (US); Massif de la Selle, Port-au-Prince, Montfleury, Aug. 11, 1926, *Ekman 6618* (B, S, US); vicinity of Cap Haitien, July 23, 1920, *Leonard 5314* (NY, US);

JAMAICA: Stony Hill, Mount Pleasant, growing in open situations, July 21, 1912, *Harris 11126* (G, NY, US); data incomplete, *Alexander s.n.* (NY).

PUERTO RICO: near Ponce, July 8, 1901, *Underwood & Griggs 695* (NY, US); Bayamon, May 19, 1916, *Stevenson 5357* (US).

VIRGIN ISLANDS: ST. CROIX: Bassin, April 7, 1896, *Ricksecker 360* (G, MBG, NY).

GUADELOUPE: Basse-Terre, introduit et cultivé, 1899, *Duss 2839* (B, NY).

BRITISH WEST INDIES: ST. VINCENT: leeward side, second growth, naturalized sparingly, alt. 100 ft., Oct., 1890, *Smith & Smith 550* (B, NY); ST. KITTS: Molyneux estate, planted along road, Sept. 8–Oct. 5, 1901, *Britton & Cowell 278* (NY); GRENADA: The Bower, St. George's, April 11, 1905, *Broadway 1799* (G, NY); UNION: leeward side at Chatham Bay, March 26, 1933, *Cooper 207* (NY); TOBAGO: Botanic Garden Station, cultivated, April 12, 1913, *Broadway 2994* (G, MBG, MP, S, US).

COLOMBIA: CAUCA: La Paila, May, 1853, *Holton s.n.* (BB, D, G).

VENEZUELA: ARAGUA: La Victoria, alt. 2000 ft., Dec. 15, 1856, *Fendler 2108* (G); Mission Station Maracay (St. Ottlien), Oct., 1925, *Zehntner s.n.* (M); BOLIVAR (?): in insula Panuramae (Orinoco), date lacking, *Bonpland 1138* (B).

BRAZIL: CEARA: planted in yards, Maranguape, Nov. 6, 1935, *Drouet 2678* (G); MATTO GROSSO: Cuyaba, Febr. 12, 1894, *Malme 1398* (S); data incomplete, *Wed-*

dell 3423 (M); MINAS GERAES: Serrados Vertentes, Aug. 22, 1882, *Glazion 14070* (MP); PARA: Para, May, 1820, *Martius 267* (M); data incomplete, *Burchell 10069* (G, MP); PERNAMBUCO: Tapera, cultivated, Febr. 9, 1934, *Pickel 3504* (US).

ECUADOR: CHIMBORAZO: vicinity of Huigra, mostly on the Hacienda de Licay, cultivated, said to come from the coast, Sept. 5, 1918, *Rose & Rose 22528* (US); EL ORO: vicinity of Santa Rosa, Oct. 17–18, 1918, *Rose & Rose 23486* (US); GUAYAS: westlich Guayaquil, Buschwald, alt. 20 m., Nov. 7, 1933, *Schimpff 407* (MBG); base of Cerro Santa Ana, alt. 10 m., cultivated, Dec. 6, 1934, *Mexia 6747* (MBG).

PERU: LORETO: forest, Mishuyacu, near Iquitos, alt. 100 m., Oct.–Nov., 1929, *Klug 100* (US); dense forest, Rio Marañon valley, alt. 150 m., Aug. 20–Sept. 8, 1929, *Killip Smith & Dennis 29226* (US); dense forest, Yurimaguas, lower Rio Huallaga, alt. 135 m., Aug. 23–Sept. 7, 1929, *Killip & Smith 27710* (US).

The variability of the corolla color of *P. rubra* already has been discussed. For the benefit of those who wish distinction in this matter, it probably is permissible to recognize the following color forms, which represent only the more prevalent variations:

P. RUBRA L. forma **typica**: corolla predominantly rose of varying intensity; usually with a “yellow eye.”

P. RUBRA L. forma **lutea** (R. & P.) Woodson, comb. nov.: corolla predominantly yellow, occasionally flushed with rose without.

P. RUBRA L. forma **acutifolia** (Ait.) Woodson, comb. nov.: corolla white, usually with a “yellow eye;” occasionally flushed with rose without.

P. RUBRA L. forma **tricolor** (R. & P.) Woodson, comb. nov.: corolla predominantly white, but the outer margin of the lobes rose; usually with a “yellow eye.”

Since the flower color usually is almost completely lost in desiccation, it is not possible to cite specimens consistently for each of these formae. *P. rubra* is the only species of either *Plumeria* or *Himatanthus* with flowers other than white “with a yellow eye”; hence it is easy to assign names which are not represented by existing specimens when the flower color has been noted as other than white, as in the case of *P. loranthifolia* Muell.-Arg., represented now by two very fragmentary specimens from southern and eastern Brazil, but described by the author as probably bearing red flowers. The type of *P. loranthifolia* almost unquestionably is an escape from cultivation

referable with confidence to *P. rubra*. It is further of interest to note that the several species of *Plumeria* described from Peru by Ruiz & Pavon are noted by the authors as occurring "in hortis"; doubtless importations from Mexico or Central America of the *P. rubra* complex.

4. *PLUMERIA* *OBTUSA* L. Sp. Pl. ed. 1. 1: 210. 1753; A. DC. in DC. Prodr. 8: 392. 1844; Britton, Bull. Torrey Bot. Club. 42: 505. 1915.

var. *typica*.

Plumeria Tenorii Gasp. Oss. Piant. Ort. Boccad. p. 20. 1833; A. DC. in DC. Prodr. 8: 391. 1844.

Plumieria obtusa L. β . *parviflora* Griseb. Mem. Amer. Acad. II. 8: 519. 1862.

Plumieria obtusa L. γ . *laevis* Griseb. Mem. Amer. Acad. II. 8: 519. 1862.

Plumeria clusioides Griseb. Cat. Pl. Cub. 171. 1866; Britton, Bull. Torrey Bot. Club 42: 504. 1915.

Plumieria emarginata Griseb. Cat. Pl. Cub. 171. 1866; Britton, Bull. Torrey Bot. Club 42: 505. 1915.

Plumieria clusioides Griseb. var. *parviflora* Maza, Ann. Soc. Esp. Hist. Nat. 23: 273. 1895.

Plumieria Krugii Urb. Symb. Ant. 1: 387. 1900.

Plumieria bahamensis Urb. Symb. Ant. 1: 387. 1900.

Plumieria portoricensis Urb. Symb. Ant. 1: 387. 1900.

Plumieria Marchii Urb. Symb. Ant. 3: 334. 1902.

Plumiera inaguensis Britton, Bull. N. Y. Bot. Gard. 3: 448. 1905.

Plumiera jamaicensis Britton, Bull. Torrey Bot. Club 37: 356. 1910.

Plumiera confusa Britton, Bull. Torrey Bot. Club 42: 505. 1915.

Plumiera nipensis Britton, Bull. Torrey Bot. Club 42: 505. 1915.

Plumieria venosa Britton, Bull. Torrey Bot. Club 42: 506. 1915.

Plumeria barahonensis Urb. in Fedde, Repert. Spec. Nov. 14: 341. 1916.

Plumeria apiculata Urb. in Fedde, Repert. Spec. Nov. **16**: 36. 1919.

Plumiera montana Britton & Wils. Bull. Torrey Bot. Club **50**: 46. 1923.

Plumeria Ostenfeldii Urb. Dansk Bot. Arkiv **47**: 8. pl. 2. 1924.

Plumeria beatensis Urb. Dansk Bot. Arkiv **47**: 9. 1924.

Plumeria dictyophylla Urb. Symb. Ant. **9**: 239. 1924.

Plumeria estrellensis Urb. Symb. Ant. **9**: 240. 1924.

Plumeria Ekmanii Urb. Symb. Ant. **9**: 239. 1924.

Plumeria cubensis Urb. in Fedde, Repert. Spec. Nov. **21**: 219. 1925.

Plumeria cayensis Urb. in Fedde, Repert. Spec. Nov. **21**: 218. 1925.

Plumeria cuneifolia Helwig, Arkiv f. Bot. **22A**¹⁰: 44. 1929.
Plants wholly glabrous throughout.

BAHAMA ISLANDS: ABACO: coppice, Eight-Mile Bay, Dec. 27, 1904, *Brace 1891* (NY); ACKLIN'S: Spring Point, Dec. 21-Jan. 6, 1906, *Brace 4275* (NY); ANDROS: Fresh Creek, June 11, 1890, *Northrop & Northrop 651* (B, BB, G, NY); CAT: Nov. 20, 1890, *Hitchcock s.n.* (MBG); CROOKED: Gun Bluff, Jan. 9-23, 1906, *Brace 4701* (NY); ELEUTHERA: Rock Sound and vicinity, Febr. 21-22, 1907, *Britton & Millspaugh 5565* (NY); GRAND TURK: scrub, Aug. 27-Sept. 1, 1905, *Nash & Taylor 3799* (US); GREAT BAHAMA: coppice, Pinder's Point, Febr. 5-13, 1905, *Britton & Millspaugh 2522* (NY); GUN CAY: April 15, 1904, *Millspaugh 2316* (FM, NY); INAGUA: Dec. 4, 1890, *Hitchcock s.n.* (MBG); LONG CAY: Hanna Hill, Dec. 7-17, 1905, *Brace 4013* (NY, US); NEW PROVIDENCE: coastal thickets near caves, Aug. 26, 1904, *Britton & Brace 299* (G, NY, US); HOG: June 7, 1909, *Wilson 8424* (NY); PROVIDENCIALES: Dec. 19, 1907, *Wilson 7750* (NY); RUM CAY: Jan. 6, 1932, *Fairchild 2570* (MBG, US); SHIP CHANNEL CAY: on rocks, Febr. 17, 1905, *Britton & Millspaugh 2757* (NY); SOUTH CAICOS: East Harbor and vicinity, March 6-7, 1911, *Millspaugh & Millspaugh 9233* (NY); WATLING'S: Cockburn Town and vicinity, March 12-13, 1907, *Britton & Millspaugh 6074* (NY); WEST CAICOS: Dec. 20, 1907, *Wilson 7757* (NY).

CUBA: CAMAGUEY: vicinity of Pueblo, Cayo Romano, Oct. 8-9, 1909, *Shafer 2470* (NY, US); on limestone tuffs, Pastelillo, June 24, 1924, *Ekman 19070* (S); Cayo Sabinal, ad marginem sylvae, Oct. 17, 1922, *Ekman 15529* (B, S); HAVANA: Yata Hills, Guanabacoa, July 19, 1917, *Leon 7337* (NY); ad Rio Quezada in cuabales, May 27, 1923, *Ekman 16448* (B, S); MATANZAS: near Nueva Gerona, Isla de Pinos, June 4, 1904, *Curtiss 524* (B, D, G, M, MBG, US); prope Cardenas, in rupibus calcareis ad Varadero, July 13, 1923, *Ekman 17138* (B, S); PINAR DEL RIO: in Sierra Organos, May 8, 1922, *Ekman 13769* (B, S); limestone hills, vicinity of Sumidero, July 28-31, 1912, *Shafer 13442* (US); SANTA CLARA: Montes de Bartolina, Aug. 1, 1930, *Leon 14641* (NY); common on rocks near Cienequita, May 15, 1895, *Combs 36* (G, MBG, MP, NY); prope urbem Santa Clara in palme-

citis, June 13, 1922, *Ekman 14044* (B, S); ORIENTE: Guana River basin, Aug. 30, 1906, *Taylor 93* (NY); prope Guatanamo, in rupibus calcareis, Oct. 24, 1914, *Ekman 2910* (B, S); prope villam Monte Verde, Jan.-July, 1859, *Wright 1381* (B, BB, Bx, D, G, MBG, MP).

JAMAICA: Plato Road, alt. 3000 ft., June 19, 1899, *Harris 7791* (B); Constant Spring, alt. 600 ft., Aug. 12, 1895, *Campbell 5973* (B); coral rocks on seashore, near Port Antonio, June 23, 1897, *Fredholm 3058* (US); Great Goat Id., Old Harbor Bay, March 4, 1908, *Harris 10168* (B, US); South Shores, Cayman Brae, Febr. 10, 1899, *Millspaugh 1229* (B).

HISPANIOLA: HAITI: limestone terraces west of Saline-Michel, Presqu'île du Nord-Ouest, Port-de-Paix, Aug. 5, 1925, *Ekman 4577* (B, S, US); Massif du Nord, Bassin-Zinne, alt. 300 m., May 9, 1926, *Ekman 6053* (S, US); Petite Gonave Is., July 9-10, 1920, *Leonard 5255* (B, US); vicinity of Basse-Terre, Tortue Is., March 27, 1929, *Leonard & Leonard 12505* (US); Massif des Cahos, Pet. Riv. de l'Artibonite, road to Mèdor, March 4, 1925, *Ekman 3381* (S); Massif de la Hotte, Morne Rochelois, Miragoane, limestone hills south of town, July 23, 1926, *Ekman 6483* (B, S); DOMINICAN REPUBLIC: Cordillera Central, Prov. de Samana, June 29, 1930, *Ekman 15486* (US); Beata Is., Febr. 23, 1922, *Ostenfeld 341* (B, NY); Distr. de Moncion, Prov. Monte Cristi, Sept. 5, prope Barahona, alt. 70 m., Aug., 1911, *Fuertes 941* (B, G, US).

PUERTO RICO: prope Maricao, in declivibus montis "Alegrijo," Nov. 26, 1884, *Sintenis 321* (B, G, US); serpentine hillside, Santa Ana, near Sabana Grande, Febr. 9, 1915, *Britton & Cowell 4034* (US); Moca, June 29, 1914, *Johnston 2055* (US); Mona Is., Dec. 20-21, 1913, *Stevens 6184* (NY).

HONDURAS: Coral Rock, Larger Is., Swan Islands, April 2, 1912, *Nelson 77* (G).

var. *sericifolia* (Wright) Woodson, comb. nov.

Plumeria tuberculata Lodd. Bot. Cab. pl. 681. 1822;
A. DC. in DC. Prodr. 8: 393. 1844.

Plumieria sericifolia Wright, ex Griseb. Cat. Pl. Cub. 171.
1866; Britton, Bull. Torrey Bot. Club 42: 504. 1915.

Plumieria emarginata Griseb. β . *sericifolia* (Wright)
Gomez, Anal. Soc. Esp. Hist. Nat. 23: 273. 1894.

Plumieria gibbosa Urb. Symb. Ant. 3: 338. 1902.

Plumieria domingensis Urb. Symb. Ant. 3: 338. 1902.

Plumiera lanata Britton, Bull. Torrey Bot. Club 42: 504.
1915.

Plumiera trinitensis Britton, Bull. Torrey Bot. Club 42:
506. 1915.

Plumeria casildensis Urb. in Fedde, Repert. Spec. Nov.
21: 218. 1924.

Plumeria pilosula Urb. Symb. Ant. 9: 238. 1924.

Plumeria leuconeura Urb. in Fedde, Repert. Spec. Nov. 24:
8. 1927.

Plumeria multiflora Standl. Field Mus. Publ. Bot. 8: 33. 1930.

Lower surface of leaves, and frequently petioles and inflorescence, more or less conspicuously pubescent; in all other essential details similar to the typical variety.

UNITED STATES: FLORIDA: Key West, date lacking, *Blodgett s.n.* (US); Miami, cultivated, Aug. 22, 1929, *Irving s.n.* (US).

BAHAMA ISLANDS: INAGUA: Dec. 4, 1890, *Hitchcock s.n.* (FM, MBG, NY).

CUBA: HAVANA: Cojimar, June 6, 1895, *Baker 5129* (B, NY); top of Loma de la Pita, San Miguel, May 20, 1920, *Leon Ekman & Roig 9117* (NY); MATANZAS: mouth of the Bueyvacá, Aug. 28, 1903, *Britton & Wilson 61* (NY); in Pan de Matanzas, solo calcares in sylvis, May 30, 1923, *Ekman 16461* (B, S); ORIENTE: Sabana to Maisi, Dec. 13, 1910, *Shafer 7908* (NY); prope Guantanamo, in rupibus calcareis, Sept. 24, 1914, *Ekman 2909* (B, S); data incomplete, *Wright 2952* (BB, D, G, MBG, NY, US); PINAR DEL RIO: coastal thicket, Bay Mariel, Sept. 21, 1910, *Britton & Earle 7590* (NY); SANTA CLARA: dry hillside, La Vigía Hill, Trinidad, March 14, 1910, *Britton & Wilson 5514* (NY); prope Casilda, in fruticetis litoralibus, March 28, 1924, *Ekman 18877* (B, S).

HISPANIOLA: HAITI: Massif de la Hotte, limestone hills, July 23, 1926, *Ekman 6483* (US); Massif de la Selle, limestone cliffs, July 20, 1926, *Ekman 6681* (S, US); Presqu'île du Nord-Ouest, Port-de-Paix, May 3, 1925, *Ekman 3995* (S, US); prope Cap Haitien, Dept. du Nord, in the steep limestone rocks of Morne La Vigie, alt. 300 m., Dec. 1, 1924, *Ekman 2716* (B, S); DOMINICAN REPUBLIC: Azua, hill north of town, March 3, 1913, *Rose Fitch & Russell 3862* (NY); rocky scrub, La Romana, Dec. 1-3, 1909, *Taylor 378* (NY); Magua, alt. 300-400 m., April 8, 1933, *Valeur 969* (MBG, NY); in thickets toward El Fronton, Cabo Samana, June 18, 1930, *Ekman 15340* (S); prope Susua, circa Puerto Grande, in rupibus calcareis ad maris litus, June 22, 1887, *Eggers 2593* (B).

MEXICO: YUCATAN: in forest, Chichen Itza, June 15, 1932, *Steere 1320* (MBG); southeast, Kancabconot, May, 1917, *Gaumer 23880* (FM, MBG, NY, US).

BRITISH HONDURAS: Honey Camp, Sept., 1928, *Lundell X* (US).

5. *PLUMERIA FILIFOLIA* Griseb. Mem. Amer. Acad. II. 8: 519. 1862; Britton, Bull. Torrey Bot. Club 42: 504. 1915.

Plumeria stenophylla Urb. Symb. Ant. 9: 237. 1924.

CUBA: ORIENTE: river cliffs, Ensenada de Mora, March 26-29, 1912, *Britton Cowell & Shafer 12951* (US); Daiquiri, in collibus calcareis ad Papaya, Nov. 18, 1916, *Ekman 8393* (B, S); prope Palmarito de Cauto, in collibus calcareis "Mogote," alt. 300 m., April 10, 1918, *Ekman 9175* (B, S); Bayate, Picote im cacum, montis c. 550 m., July 16, 1916, *Ekman 7409* (S); Maria Pilar, ad Rio Baconas in collibus siccis (solo eruptivo), Nov. 5, 1916, *Ekman 8236* (S); in rupibus calcar. ad Rio Jimbambay, Sierra de Nipe, April 27, 1919, *Ekman 9569* (B); top of mountain, Palmarito de Canto, June 27, 1924, *Ekman 19087* (S); data incomplete, 1860, *Wright 1660* (B, BB, Bx, D, G, MBG, ISOTYPES).

6. *PLUMERIA ALBA* L. Sp. Pl. ed. 1. 1: 210. 1753; A. DC. in DC. Prodr. 8: 392. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Plumeria hypoleuca Gasp. Oss. Piant. Ort. Boccad. p. 20. 1833; A. DC. in DC. Prodr. 8: 392. 1844.

Plumeria hypoleuca Gasp. β . *angustifolia* Gasp. Oss. Piant. Ort. Boccad. p. 20. 1833.

Plumeria alba L. β . *Jacquiniana* A. DC. in DC. Prodr. 8: 392. 1844.

PUERTO RICO: coastal thickets, Dorado, Febr. 13, 1914, *Britton & Cowell 1499* (NY, US); Manati, June 13, 1914, *Stevenson 548* (US); Fajardo, in fruticetis, May 20, 1885, *Sintenis 1633* (G, US); very dry hillside with cactus, Agaves, etc., Coama Springs, July 1, 1901, *Underwood & Griggs 543* (US); Arecibo, May 21, 1913, *Stevens 1776* (NY); thicket, Vieques Is., Febr. 7, 1914, *Shafer 2766* (MBG, NY, US); prope Bayamon in petrosis maritimis, June, 1886, *Stahl 546* (B).

VIRGIN ISLANDS: ST. CROIX: Salt River, May 15, 1896, *Ricksecker 395* (G, MBG, NY, US); ST. JOHN: mountain slopes, rocky soil, June 22, 1921, *Morrow 147* (US); ST. THOMAS: hillside thicket, Cowell Point, Jan. 31–Febr. 4, 1913, *Britton Britton & Shafer 86* (NY, US); hillside, Buck Is., Febr. 7, 1913, *Britton & Shafer 377* (NY, US).

BRITISH WEST INDIES: ANAGADA: rocky plain near settlement, Febr. 19–20, 1913, *Britton & Fishlock 1059* (NY); ANTIGUA: near Cades Bay, Febr. 10, 1913, *Rose Fitch & Russell 3405* (NY, US); BECQUIA: data incomplete, *Smith & Smith B99* (G); GRENADA: Quarentine Station, St. George's, May 22, 1906, *Broadway s.n.* (NY); MONTSERRAT: dry hillside, Bransby Point, Jan. 21, 1907, *Shafer 108* (NY, US); TORTOLA: rocky hillside, road to Sea Cove Bay, Febr. 13–17, 1913, *Britton & Shafer 682* (NY, US); VIRGIN GORDA: coastal hills, Little Dix Bay, Nov. 13, 1918, *Fishlock 79* (NY).

FRENCH WEST INDIES: GUADELOUPE: endroits secs et rocailleux, 1903, *Duss 2838* (B, NY, US); MARTINIQUE: endroits rocailleux, Ste. Anne, 1883, *Duss 1863* (B, NY, US).

DUTCH WEST INDIES: ST. MARTIN: hedges, Sept. 6, 1901, *Britton & Cowell 80* (NY); SABA: 1906, *Boldingh 1354* (B, NY).

This certainly is the most constant species of *Plumeria*. The peculiar form of "puckered" revolution of the desiccated leaves is one of the most characteristic features of *P. alba*, and is well shown in the old plates in Miller's 'Dictionary.'

7. *PLUMERIA SUBSESSILIS* A. DC. in DC. Prodr. 8: 393. 1844.

Plumeria Berterii A. DC. in DC. 8: 393. 1844.

Plumeria Jaegeri Muell.-Arg. Linnaea 30: 397. 1860.

HISPANIOLA: HAITI: Morne Dumais, in declivibus siccis, alt. 1000 m., Aug., 1916, *Buch 1341* (B, US); Massif de la Selle, between Fort-Jacques and Cadets, alt.

1100–1200 m., Sept. 7, 1924, *Ekman 1806* (S, US); Massif des Matheux, Thomazeau, Morne-à-Cabrits, alt. 350 m., May 17, 1928, *Ekman 9977* (B, US); Port-au-Prince to Petionville, alt. 500 ft., hillside, Sept. 6, 1903, *Nash 964* (NY); arid foothill, vicinity of Fond Parisien, Étang Saumatre, May 5–13, 1920, *Leonard 4150* (NY, US); arid foothills, vicinity of Petionville, alt. 350 m., June 15–28, 1920, *Leonard 4844* (NY, US); banks along road from Petionville to Port-au-Prince, May 19–23, 1929, *Leonard & Leonard 15822* (NY, US); Monte Cabrete, Aug. 26, 1917, *Cook Scofield & Doyle 73* (US); in alpinus montis La Coupe, June 30, 1928, *Jaeger 194* (B, G, NY, S, US); DOMINICAN REPUBLIC: vicinity of Constanza, April 10–May 15, 1919, *Abbott s.n.* (US); Barahona, alt. 300 m., March, 1911, *Fuertes 883* (B, D, US); prope Mamil de Ocoa, alt. 300 m., in declivibus apricis, Oct., 1910, *Tuerckheim 3754* (M, NY); Arroya de Voca, March 20, 1922, *von Schrenk 39* (MBG); Azua, Bohios del Canal, steep hillside, c. 750 m., March 26, 1929, *Ekman 12057* (B, S).

The peculiar form and venation of the foliage render this perhaps the most distinctive species of *Plumeria*. Its possible hybridization with other species is treated in the following paragraphs.

EVIDENCES OF HYBRIDIZATION IN THE GENUS PLUMERIA

As one examines a representative suite of herbarium specimens of *Plumeria* from Hispaniola, one is struck by the great variability of the plants from the Republic of Haiti. This variation is not more or less quantitative, as that of *P. obtusa* in Cuba, for example, but is rather conspicuously qualitative as well. The great diversification of *Plumerias* in Haiti has prompted several specific segregates by Urban and Ekman. Far from producing the desired result of more concise identification, however, the recent "splitting" of species has led only to confusion in correlating an increasing diversification of leaf forms with the published descriptions.

In an attempt to solve the problem of variation of the Haitian *Plumerias*, one is confronted at the outset, as has been implied, with the fact that Hispaniola is the only land mass where such a condition occurs. Secondly, one remembers *P. subsessilis*, which is endemic to Hispaniola, and its peculiar, subsessile leaves with exceedingly prominent venation with secondary veins abruptly entering the midrib at a conspicuously decurrent angle. The occurrence of modifications of the peculiar venation of *P. subsessilis* is found to a greater or lesser extent

in specimens of the recently segregated "species," together with a marked tendency toward the continuously arcuate or subhorizontal venation of other species of *Plumeria*; and almost at once suggests the explanation of the coincident variability of the genus in Hispaniola and the endemism of *P. subsessilis* upon the basis of interfertility of that species with other neighboring congeners.

Beside *P. subsessilis*, both *P. obtusa* L. (two varieties) and *P. rubra* L. occur in Haiti, the former probably indigenous, the latter doubtless introduced. The characteristics of these three putative parents of the supposed hybrids may be summarized as follows:

- P. subsessilis* A. DC. Leaves oblong to oblong-obovate, obtuse to very abruptly acuminate, subsessile, 8–24 cm. long, 2.5–5.5 cm. broad, rather delicately membranaceous, the secondary veins departing from the leaf margin subhorizontally or in a broad arc, abruptly entering the midrib at an acute, conspicuously decurrent angle; aestivation of corolla-lobes somewhat spiral; flowers white "with a yellow eye"; plants wholly glabrous.
- P. rubra* L. Leaves broadly elliptic, obovate to oblong-oblancheolate, obtuse to acuminate, long-petiolate, 12–50 cm. long, 3.5–15.0 cm. broad, firmly membranaceous, opaque, wholly glabrous to densely pubescent beneath, the secondary venation broadly arcuate to essentially rectilinear, sometimes entering the midrib in an inconspicuously decurrent fashion; inflorescence glabrous to more or less pubescent; corolla white "with a yellow eye" to various shades of rose and yellow, occasionally particolored, aestivation of the lobes strikingly spiral.
- P. obtusa* L. Leaves obovate to obovate-oblong, obtuse or rounded to very shortly acuminate, 3.5–18.0 cm. long, 1.0–8.5 cm. broad, manifestly petiolate, coriaceous to subcoriaceous, more or less lustrous above, wholly glabrous to densely pubescent beneath, secondary venation continuously oblique or subhorizontal, essentially rectilinear, directly entering the midrib; inflorescence glabrous; corolla white "with a yellow eye," aestivation of the lobes nearly longitudinal or only slightly spiral.

As one examines the supposed hybrids, it is found possible to sort them roughly into two groups as follows:

Group 1: Very closely resembling *P. subsessilis*, but leaves with less characteristic venation, and with petioles 0.5–2.5 cm. long; inflorescence tending to be pubescent in some cases, and leaves more nearly elliptic, but still rather delicately membranaceous and not at all coriaceous, occasionally somewhat pubescent:

HAITI: Massif des Matheux, July 15, 1924, *Ekman 904* (US); Massif des Matheux, Thomazeau, May 17, 1928, *Ekman 9975* (US); same locality, July 3, 1927, *Ekman 8563* (B); Morne à Cabrits, July 14, 1924, *Ekman 889* (B, TYPE of *P. longiflora* Urb. & Ekm.); Morne à Cabrits, July 3, 1927, *Eyerdam 3* (G,

US); in territorio Plaine, July, 1900, *Buch 348* (B, TYPE of *P. Paulinae*, NY, ISOTYPE); in Plaine ad M. Mori, July, 1897, *Picarda 1608* (B, TYPE of *P. stenopetala* Urb.); Gonaives, plain, alt. 400 ft., Aug. 16, 1905, *Nash & Taylor 1774* (NY); Massif des Matheux, Croix-des-Bouquets, July 18, 1924, *Ekman 972* (US); Coupe de Pintad, Aug. 21, 1924, *Cook 11* (NY, US).

Group 2: Leaves broadly elliptic to obovate-elliptic, broadly acuminate, 12–35 cm. long, 3–11 cm. broad, firmly membranaceous, opaque above, densely pubescent to glabrate beneath, secondary venation mostly broadly arcuate, frequently with a trace of the decurrent entry to the midrib characteristic of *P. subsessilis*; petioles 1–7 cm. long; inflorescence occasionally somewhat pubescent; flowers white “with a yellow eye,” occasionally “yellow at base,” or “bud purplish without,” aestivation of the lobes somewhat spiral:

HAITI: Dog Mountain, vicinity of Bombardopolis, Febr. 21–26, 1929, *Leonard & Leonard 13531* (MBG, US); vicinity of Mole St. Nicholas, Mole Gorge, arid thickets, Febr. 16, 1929, *Leonard & Leonard 3315* (US); vicinity of Bassin Bleu, arid mountain several miles west of town, April 17, 1929, *Leonard & Leonard 14769* (US); trail to Moustique Mts., vicinity of Bassin Bleu, April 21, 1929, *Leonard & Leonard 14930* (US); Massif de la Hotte, Jeremie, between Sources-Chaudes and Source-Cahouane, July 4, 1928, *Ekman 10239* (US); Massif de la Selle, prope Nouvelle Tourraine, Aug. 7, 1924, *Ekman 1359* (B, TYPE of *P. discolor* Urb. & Ekm., US, ISOTYPE); Massif de la Selle, Rio de la Gorge, in rocks, Febr. 13, 1925, *Ekman 3224* (B); dry lands along Puilboreau Road, vicinity of Ennery, Jan. 17, 1926, *Leonard 8900* (G, NY, US); Massif des Matheux, May 8, 1927, *Ekman 8084* (US); Massif de la Hotte, prope Petit-Goave, Aug. 1, 1926, *Ekman 6565* (B); Port-au-Prince, in horto cult., Oct. 6, 1924, *Ekman 2053* (B); inter Massif de la Selle et La Hotte prope Trouin, in collibus calc. ad rivulum, 500 m., alt., Nov. 5, 1924, *Ekman 2378* (B, TYPE of *P. trouinensis* Urb. & Ekm.); Massif de la Hotte, Grand-Goave, road Carrefour-Fauche to Trouin, in limestone hills, April 16, 1926, *Ekman 5867* (B, US); vicinity of Cabaret, Baie des Moustiques, Jan. 15, 1929, *Leonard & Leonard 12033* (US); Massif de la Selle, between Bois d’Orme and Dessoziers, April 19, 1926, *Ekman 5880* (B); La Brand to Mt. Balance, xerophytic region, Aug. 15, 1905, *Nash & Taylor 1650* (NY); Mt. La Mine, vicinity of St. Michel de l’Atalaye, Nov. 19, 1925, *Leonard 7229* (NY, US); same locality [leaves intermediate between group 1 and group 2], Nov. 22, 1925, *Leonard 7351* (G, US).

A comparison of the diagnoses of the three possible parent species and the two groups of putative hybrids will show a certain connection of the latter for *P. subsessilis*, and a more pronounced affinity with *P. rubra* than with *P. obtusa*, evidenced in group 2 by the large leaves of outline so resembling that characteristic of *P. rubra* that even Urban called attention to it (Symb. Ant. 3: 337. 1902, sub *P. biglandulosa*). An additional indication of hybridity involving *P. rubra* may be the occasional description of the flower color by collectors as “yel-

low at the base," and "buds purplish without," as well as the occasional pubescence of the inflorescence.

On the other hand, were *P. obtusa* involved in hybridization with *P. subsessilis*, one would expect the leaves of the hybrids to be more nearly the size of the former's, both with respect to the lamina and the petiole, and to have a heavier texture, together with a tendency toward an obovate outline. *P. obtusa* might also be expected to impart to its progeny flower buds with more nearly longitudinal aestivation of the corolla-lobes, and without a tendency toward yellow or purplish coloration of the corolla. Upon the basis of the foregoing considerations, obviously fallible without experimental evidence most difficult at the moment to obtain, a fair degree of confidence may be placed in ascribing putative hybridity to the following segregate species:

PLUMERIA rubra L. \times P. subsessilis A. DC. (?)

Plumieria biglandulosa Urb. Symb. Ant. **3**: 337. 1902.

Plumieria Paulinae Urb. Symb. Ant. **3**: 336. 1902.

Plumieria stenopetala Urb. Symb. Ant. **3**: 335. 1902.

Plumieria stenopetala Urb. var. *angustissima* Urb. Arkiv f. Bot. **17**^r: 50. 1921.

Plumieria longiflora Urb. & Ekm. in Urb. Arkiv f. Bot. **20A**⁵: 38. 1926.

Plumieria discolor Urb. & Ekm. in Urb. Arkiv f. Bot. **20A**⁵: 36. 1926.

Plumieria trouinensis Urb. & Ekm. in Urb. Arkiv f. Bot. **20A**⁵: 37. 1926.

At this point, attention should be called to the fact that at least some of the putative hybrids of *P. rubra* \times *P. subsessilis* are fertile, producing follicles containing perfectly formed seeds.

Hybrids found in nature very rarely range themselves in a position exactly intermediate between either parent; therefore it is not surprising to find that the putative hybrids of *P. rubra* \times *P. subsessilis* may be divided roughly into two groups, favoring one or the other parent in gross habit. The herbarium doubtless has its difficulties for the detection of hybridization,

but the methods of systematists who may be interested in the origins of their exsiccatae frequently have been confirmed by experimental geneticists and cytologists (cf. Clausen, J. Cytological evidence for the hybrid origin of *Pentstemon neotericus* Keck. *Hereditas* **18**: 65–76. 1933; Anderson, E. An experimental study of hybridization in the genus *Apocynum*. *Ann. Mo. Bot. Gard.* **23**: 159–168. 1936).

At least two reasons present themselves for the absence of hybrids from the Dominican Republic in sharp contrast to the abundance from Haiti. Collections from the former, as a whole, are far fewer than from Haiti. Hybrids may very well exist undetected under such conditions. Another consideration of possible importance, however, is the fact that although Haiti is approximately one half the area of the Dominican Republic, the population is nearly three times greater. *P. subsessilis* is indigenous to both republics. *P. rubra*, on the other hand, is introduced, and the opportunities of hybridization might well be greater in a country of high population than in one more sparsely settled. Several botanists have noticed the abundance of plant hybrids in regions disturbed by the human population (cf. Wiegand, K. M. A taxonomist's experience with hybrids in the wild. *Science* n.s. **81**: 161–166. 1935; Anderson, E. Hybridization in American *Tradescantias*. *Ann. Mo. Bot. Gard.* **23**: 511–525. 1936).

EXCLUDED OR DUBIOUS SPECIES

(Literature of the western hemisphere only)

Plumeria ambigua Muell.-Arg. in Mart. Fl. Bras. **6**¹: 37. 1860 = *HIMATANTHUS PHAGEDAENICA* (Mart.) Woodson, *Ann. Mo. Bot. Gard.* **25**: 199. 1938 (*Plumeria phagedaenica* Mart. in Spix & Mart. Reise Bras. **3**: 1128. 1831).

Plumeria angustifolia Aubl. Pl. Guyan. 259. 1775, nom. subnud. Perhaps equivalent to *P. rubra* L.

Plumeria articulata Vahl, *Eclog.* **2**: 20. 1798 = *HIMATANTHUS ARTICULATA* (Vahl) Woodson, *Ann. Mo. Bot. Gard.* **25**: 196. 1938.

Plumeria attenuata Benth. in Hook. Jour. Bot. **3**: 245. 1841 =

HIMATANTHUS ATTENUATA (Benth.) Woodson, Ann. Mo. Bot. Gard. **25**: 197. 1938.

Plumeria bracteata A. DC. in DC. Prodr. **8**: 394. 1844 = *HIMATANTHUS BRACTEATA* (A. DC.) Woodson, Ann. Mo. Bot. Gard. **25**: 200. 1938.

Plumeria cuspidata Glaziou, Bull. Soc. Bot. Fr. **52**: Mem. 3e. 451. 1905. nom. subnud. The specimen is in fruit only, and certainly is not apocynaceous.

Plumeria drastica Mart. in Spix & Mart. Reise Bras. **2**: 547. 1828 = *HIMATANTHUS ARTICULATA* (Vahl) Woodson, Ann. Mo. Bot. Gard. **25**: 196. 1938 (*Plumeria articulata* Vahl, Eclog. Amer. **2**: 20. 1798).

Plumeria fallax Muell.-Arg. in Mart. Fl. Bras. **6**¹: 38. 1860 = *HIMATANTHUS PHAGEDAENICA* (Mart.) Woodson, Ann. Mo. Bot. Gard. **25**: 199. 1938 (*Plumeria phagedaenica* Mart. in Spix & Mart. Reise Bras. **3**: 1128. 1831) in part; *HIMATANTHUS ARTICULATA* (Vahl) Woodson, Ann. Mo. Bot. Gard. **25**: 196. 1938 (*Plumeria articulata* Vahl, Eclog. Amer. **2**: 20. 1798) in part.

Plumeria floribunda Muell.-Arg. in Mart. Fl. Bras. **6**¹: 40. 1860 = *HIMATANTHUS SUCUUBA* (Spruce) Woodson, Ann. Mo. Bot. Gard. **25**: 198. 1938 (*Plumeria Sucuuba* Spruce, ex Muell.-Arg. in Mart. Fl. Bras. **6**¹: 40. 1860) in part; *HIMATANTHUS PHAGEDAENICA* (Mart.) Woodson, Ann. Mo. Bot. Gard. **25**: 199. 1938 (*Plumeria phagedaenica* Mart. in Spix & Mart. Reise Bras. **3**: 1128. 1831) in part.

Plumeria hilariana Muell.-Arg. in Mart. Fl. Bras. **6**¹: 39. 1860 = *HIMATANTHUS OBOVATA* (Muell.-Arg.) Woodson var. *PUBERULA* (Muell.-Arg.) Woodson, Ann. Mo. Bot. Gard. **25**: 201. 1938 (*Plumeria puberula* Muell.-Arg. in Mart. Fl. Bras. **6**¹: 39. 1860).

Plumeria lancifolia Muell.-Arg. in Mart. Fl. Bras. **6**¹: 41. 1860 = *HIMATANTHUS LANCIFOLIA* (Muell.-Arg.) Woodson, Ann. Mo. Bot. Gard. **25**: 200. 1938.

Plumiera latifolia Pilger, in Engl. Bot. Jahrb. **30**: 183. 1901 = *HIMATANTHUS OBOVATA* (Muell.-Arg.) Woodson var. *PUBERULA* (Muell.-Arg.) Woodson, Ann. Mo. Bot. Gard. **25**: 201. 1938 (*Plumeria puberula* Muell.-Arg. in Mart. Fl. Bras. **6**¹: 39. 1860).

Plumeria Martii Muell.-Arg. in Mart. Fl. Bras. 6¹: 37. 1860 = HIMATANTHUS PHAGEDAENICA (Mart.) Woodson, Ann. Mo. Bot. Gard. 25: 199. 1938 (*Plumeria phagedaenica* Mart. in Spix & Mart. Reise Bras. 3: 1128. 1831).

Plumeria microcalyx Standl. Field Mus. Publ. Bot. 4: 254. 1929 = HIMATANTHUS ARTICULATA (Vahl) Woodson, Ann. Mo. Bot. Gard. 25: 196. 1938 (*Plumeria articulata* Vahl, Eclog. Amer. 2: 20. 1798).

Plumeria obovata Muell.-Arg. in Mart. Fl. Bras. 6¹: 40. 1860 = HIMATANTHUS OBOVATA (Muell.-Arg.) Woodson, Ann. Mo. Bot. Gard. 25: 201. 1938.

Plumeria oligoneura Malme, Arkiv f. Bot. 21A⁶: 6. 1927. See note, p. 201.

Plumeria phagedaenica Mart. in Spix & Mart. Reise Bras. 3: 1128. 1831 = HIMATANTHUS PHAGEDAENICA (Mart.) Woodson, Ann. Mo. Bot. Gard. 25: 199. 1938.

Plumeria puberula Muell.-Arg. in Mart. Fl. Bras. 6¹: 39. 1860 = HIMATANTHUS OBOVATA (Muell.-Arg.) Woodson var. PUBERULA (Muell.-Arg.) Woodson, Ann. Mo. Bot. Gard. 25: 201. 1938.

Plumeria revoluta Huber, Bull. Soc. Bot. Genève II. 6: 200. 1915 = HIMATANTHUS BRACTEATA (A. DC.) Woodson, Ann. Mo. Bot. Gard. 25: 200. 1938 (*Plumeria bracteata* A. DC. in DC. Prodr. 8: 394. 1844).

Plumeria speciosa Muell.-Arg. in Mart. Fl. Bras. 6¹: 36. 1860 = HIMATANTHUS PHAGEDAENICA (Mart.) Woodson, Ann. Mo. Bot. Gard. 25: 199. 1938 (*Plumeria phagedaenica* Mart. in Spix & Mart. Reise Bras. 3: 1128. 1831).

Plumeria Sucuuba Spruce, ex Muell.-Arg. in Mart. Fl. Bras. 6¹: 40. 1860 = HIMATANTHUS SUCUUBA (Spruce) Woodson, Ann. Mo. Bot. Gard. 25: 198. 1938.

Plumeria tarapotensis K. Sch. ex Mgf. Notizblatt 11: 339. 1932 = HIMATANTHUS SUCUUBA (Spruce) Woodson, Ann. Mo. Bot. Gard. 25: 198. 1938 (*Plumeria Sucuuba* Spruce, ex Muell.-Arg. in Mart. Fl. Bras. 6¹: 40. 1860).

Plumeria velutina Muell.-Arg. in Mart. Fl. Bras. 6¹: 38. 1860 = HIMATANTHUS OBOVATA (Muell.-Arg.) Woodson var. PU-

BERULA (Muell.-Arg.) Woodson, Ann. Mo. Bot. Gard. **25**: 201. 1938 (*Plumeria puberula* Muell.-Arg. in Mart. Fl. Bras. **6**¹: 39. 1860).

Plumeria Warmingii Muell.-Arg. Kjoeb. Vidensk. Meddel. p. 99. 1869 = HIMATANTHUS OBOVATA (Muell.-Arg.) Woodson, Ann. Mo. Bot. Gard. **25**: 201. 1938 (*Plumeria obovata* Muell.-Arg. in Mart. Fl. Bras. **6**¹: 40. 1860).



Woodson, Robert E. 1938. "Studies in the Apocynaceae. VII. An Evaluation of the Genera *Plumeria* L. and *Himatanthus* Willd." *Annals of the Missouri Botanical Garden* 25, 189–224. <https://doi.org/10.2307/2394479>.

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